ES.a-q - Elements from the sea | ES1-7

ES.Q Exam questions from past papers

The Haber process N_2 (g) + $3H_2$ (g) ⇌ $2NH_3$ (g) was formed due to Mrs Marsden and Mr Harbage giving their students impossible tests. The concentration for Ammonia = 32 moldm^{-3} and Kc = 2 moldm^{-3} **What is the concentration of Nitrogen and Hydrogen?**	Nitrogen - 2 moldm^{-3} Hydrogen 2 moldm^{-3}
Ammonia is not often made at temperatures below 473K. This is because the equilibrium is established too slowly at lower temperatures. Explain why the rate of a reaction increases with temperature. (2) **(v)** Ammonia is not often made at temperatures below 473 K. This is because the equilibrium is established too slowly at lower temperatures. Explain why the rate of a reaction increases with temperature. .... **[2]**	Particles have more energy (1) and so there would be more frequent collisions with energy greater than the activation enthalpy (1) **(c)** **(v)** Molecules/particles move faster/have more energy ✓ — **2** — **1.2** — "Atoms" **CON** first marking point More (frequent) collisions with energy greater than activation enthalpy/E_a ✓ — **ALLOW** more successful collisions
Gallium has two isotopes, 69Ga and ^{71}Ga. The Ar of gallium is 69.7. Calculate the relative abundance of ^{69}Ga as a percentage. **(d)** Gallium has two isotopes, ^{69}Ga and ^{71}Ga. The A_r of gallium is 69.7. Calculate the relative abundance of ^{69}Ga as a percentage. relative abundance of ^{69}Ga = ... % **[2]**	• (69 x (x)) + (71 x (1-x)) = 69.7 • 69x + 71 - 71x = 69.7 • 2x = 1.3 • X = 0.65 • X = 65% **22** **d** — **CHECK ANSWER ON ANSWER LINE** 65% scores 2✓✓ 69x/100 + 71(100 – x)/100 = 69.7 **OR** 69x +71(1-x) = 69.7✓ Answer = 65% ✓
(ii) All three products from the membrane cell are used in the chemical industry. Write the overall equation for the formation of these three products in the cell. $2H_2O + 2NaCl \rightarrow 2NaOH + Cl_2 + H_2$ **(iii)** State and explain the atom economy of the reaction in **(ii)**. State and explain the atom economy of the reaction ? (1)	• 100% useful • No waste • All useful/desired products **(iii)** 100% since... no waste **or** all useful/desired products

$CH_4(g) + H_2O(g) \rightleftharpoons 3H_2(g) + CO(g)$ $\Delta_r H = +206\,kJ\,mol^{-1}$ **Equation 33.1** **(e)** The steam reforming reaction shown in **equation 33.1** makes hydrogen. Much of the hydrogen is used in the manufacture of ammonia. **(i)** Calculate the atom economy of the reaction in **equation 33.1** when making hydrogen. atom economy = ... % **[1]** $CH_4(g) + H_2O(g)$ $3H_2(g) + CO(g)$ $\Delta rH = +206 kJmol^{-1}$ Equation 33.1 (e) The steam reforming reaction shown in equation 33.1 makes hydrogen. Much of the hydrogen is used in the manufacture of ammonia. (i) Calculate the atom economy of the reaction in equation 33.1 when making hydrogen.	**Question** (e) (i) — **Answer**: 6 x 100/ (16 + 18) = 17.6/17.65/18✓ ● (3x2)/(12+4)+(2+16) x 100 ● 6/(16 + 18) x 100 ● 17.65

ES.a - Formulae, equations and amount of substance | ES6 |

What is atom economy and how is it calculated?	A measure of how efficient a reaction is (Relative formula mass not MASS in grams $\text{atom economy} = \frac{\text{Mr of design products}}{\text{Mr of reactants}}$
What is a hydride?	A binary compound of hydrogen and a metal
What is a peroxide?	A compound containing two oxygen atoms bonded together (O-O)
What is an -ide?	A binary compound in which the nonmetal is given an -ide suffix (e.g., sodium oxide)
What do -ate compounds contain?	Oxygen and at least one other element *Examples include: Chlorate, nitrate and carbonate*
What is the charge of the ion Nitrite(III) and state oxidation numbers?	NO_2^-
What is the charge of the ion Sulfite(IV) and state oxidation numbers?	SO_3^{2-}
What is the charge of the ion Sulfate (VI) and state oxidation numbers??	SO_4^{2-}

What is the charge of the ion Nitrate (V) and state oxidation numbers??	NO_3^-
What is the charge of the ion Phosphate(V) and state oxidation numbers??	PO_4^{3-}
What is the charge of the ion Carbonate(IV) and state oxidation numbers??	CO_3^{2-}

ES.b-g - Redox | ES2 | ES3 | ES5 |

What is the oxidation number?	The no of electrons removed from an atom
What are the 4 definitions for oxidation?	● The loss of electrons ● The gaining of oxygen atoms ● The increase in oxidation number ● The loss of hydrogen atoms (**Learned about in WM with alcohols & phenols**)
What are the 4 main rules for oxidation numbers?	1. Elements always have an oxidation no. of 0 2. Sum of oxidation no. in a compound = 0 3. Sum of oxidation no. of a simple ion = its charge 4. Sum of oxidation no of a compound ion = its charge
What is a reduction reaction? What is a oxidation reaction?	● Reduction reactions are the loss of oxygen atoms or gaining of electrons ● Opposite for oxidation *Remember OILRIG*
What are the 3 exceptions to oxidation rules?	1. Hydrogen is always +1 **except** when in a hydride where its -1 2. Oxygen is always -2 **except** with peroxides where its -1 or F 3. Chlorine is always -1 **except** when bonded with oxygen or F
What is the mnemonic for remembering whether the anode and cathode is positive or negative?	Positive Anode Negative Is Cathode PANIC

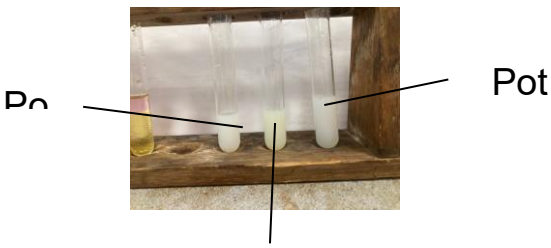
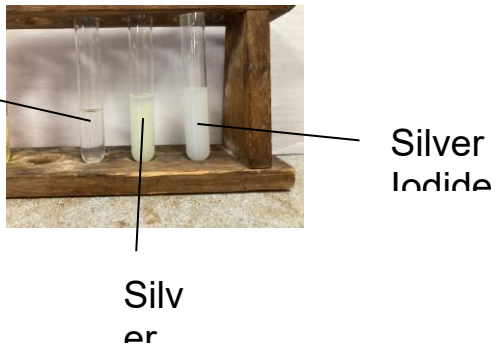
How can SIMPLE half-equations be combined?	• These can be combined by adding them such that the electrons on either side cancel • $Br_2 + 2e^- = 2Br^-$ • $2I^- = I_2 + 2e^-$
How can half-equations containing ^{12}O be balanced?	1. Check that the element that is changing oxidation state is initially balanced i.e $MnO_4^{2-} > Mn^{2+}$ checking Mn atoms are balanced 2. Hydrogen ions and waters - balance atoms using H^+ and H_2O 3. Charges - balance charges using electrons 4. Check - check that atoms and charges balance. *This can be remembered as dodgy HOC* *You could also do the longer way by balancing an equation using OXIDATION STATES*
Which REDOX reaction occurs at the cathode and mnemonic?	Reduction *REDCAT*
Which REDOX reaction occurs at the anode and mnemonic?	Oxidation *OXANA*
What products are made at a cathode of an electrolysis of solutions?	• Hydrogen if the metal is above hydrogen in the reactivity series • The Metal is produced for metals below hydrogen in the reactivity series • Hydrogen also is made on electrolysis of acids
What products are made at an inert (unreactive) anode of an electrolysis of solutions?	• Halogen if the salt is a halide • Oxygen if the salt is a sulfate or nitrate • Oxygen also is made on electrolysis of hydroxides
What is the metal e.g and half equation made at a reactive anode in $CuSO_{4\,(aq)}$	Copper and $Cu_{(s)} = Cu^{2+}_{(aq)} + 2e^-$
What is the half equation at the inert anode if the salt is a sulfate or nitrate?	$2H_2O\,(l) \rightarrow O_2\,(g) + 4H^+\,(aq) + 4e^-$

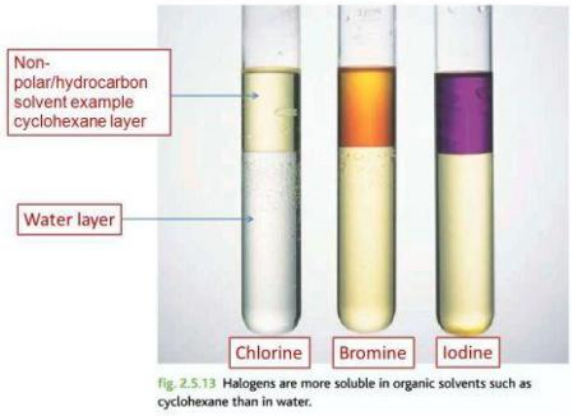
What is the half equation at the inert anode if a hydroxide is being electrolysed?	$4OH^-$ (aq) -> O_2 (g) + $2H_2O$ (l) + $4e^-$
What is the half equation at the cathode if the metal in the salt is group 1 or 2 or is aluminium?	$2H_2O$ (l) + $2e^-$ -> $2OH^-$ (aq) + H_2 (g)
What is the half equation at the cathode on electrolysis of acids?	$2H^+$ (aq) + $2e^-$ -> H_2 (g)
What is an oxidising agent?	A substance that gains electrons and is reduced in a chemical reaction
What is a reducing agent?	A substance that loses electrons and is oxidised in a chemical reaction
Define Electrolysis	A chemical change caused by passing an electric current through a compound which is either molten or in solution *Don't need to remember but its good to be aware of in terms of chemical properties*
Define Electrolyte	A ionic compound in molten or solution that conducts electricity *Don't need to remember but its good to be aware of in terms of chemical properties*
What does starch solution test for?	Iodine
What colour is an acid or an alkali if phenolphthalein is present?	Colourless and pink Titration / Phenolphthalein / Methyl orange strong acid + weak base / / Yes weak acid + strong base / Yes / strong acid + strong base / Yes / Yes
What colour is an acid or an alkali if methyl orange is present?	Red orange and yellow Titration / Phenolphthalein / Methyl orange strong acid + weak base / / Yes weak acid + strong base / Yes / strong acid + strong base / Yes / Yes
What is thiosulfate redox titration equation and its color change?	• $2S_2O_3^{2-}{}_{(aq)} + I_{2\,(aq)}$ -> $2I^-{}_{(aq)} + S_4O_6^{2-}{}_{(aq)}$ • By combining $2S_2O_3^{2-}$ -> $S_4O_6^{2-}$ + $2e^-$ and I_2 + e^- -> $2I^-$ • Left is yellow/brown solution, right is colourless

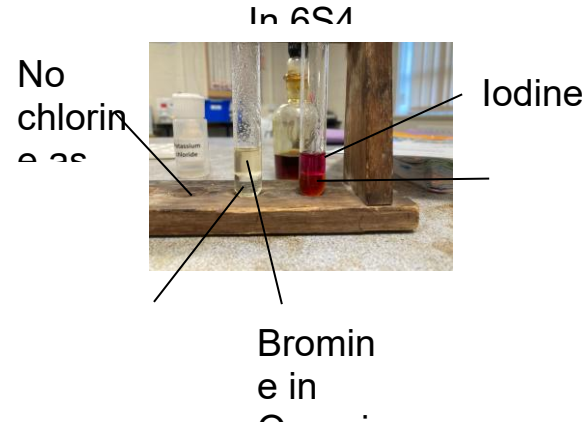
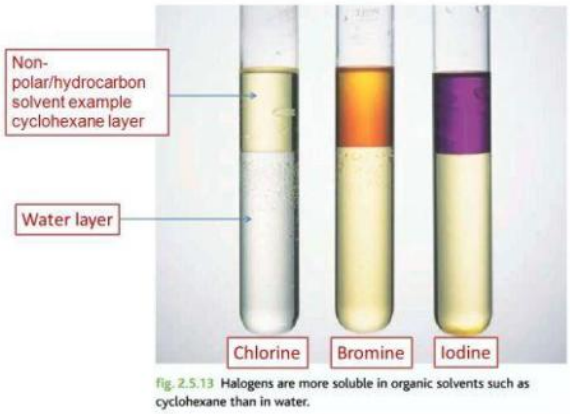
What is the problem with the endpoint of a thiosulfate redox titration? What should be done? Why does this work? (with colours)	● The colour change is hard to spot ● Starch indicator is added NEAR THE ENDPOINT to emphasise it (otherwise you get a false positive) ● It turns from blue-black to colourless ● Since with starch and I_2, you have blue-black. Yet once it is all used up (by adding thiosulfate) it becomes colourless. See below: $2S_2O_3^{2-}(aq) + I_2\ (aq) \rightarrow 2I^-(aq) + S_4O_6^{2-}(aq)$
How are thiosulfate reactions useful?	You can determine the concentration of oxidising agent since $[O] + I^- \rightarrow I_2$ and then you can measure the conc of I_2 by doing thiosulfate titration. Since $2S_2O_3^{2-}(aq) + I_2(aq) \rightarrow 2I\text{-}(aq) + S_4O_6^{2-}(aq)$
What should you look out for when doing oxidation/reduction questions (most likely 1 or 2 marks)	For oxidation/reduction questions check if there are asking for electron transfer or oxidation number change and only include what the question requires I.e. $MnO_4^{2-} \rightarrow Mn^{2+}$ Electron transfer: Mn loses 4 electrons Oxidation number change: Mn changes from +6 to +2
What is the formula for percentage purity?	(Mass of sample / mass of impure sample) x 100

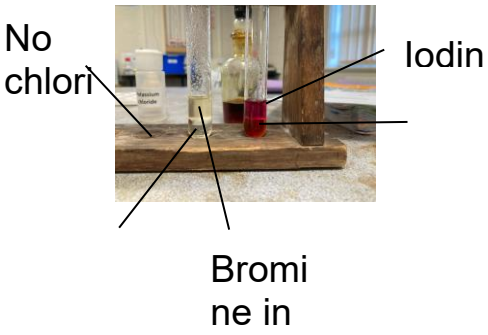
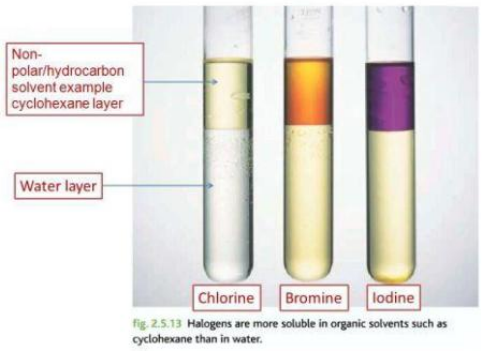
ES.h-n - Inorganic chemistry and the periodic table | ES1 | ES5 | ES6 |

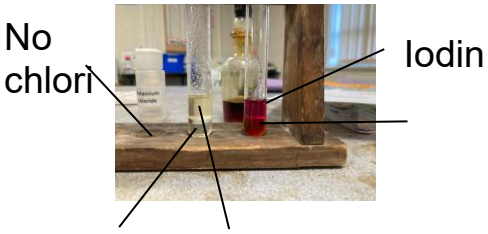
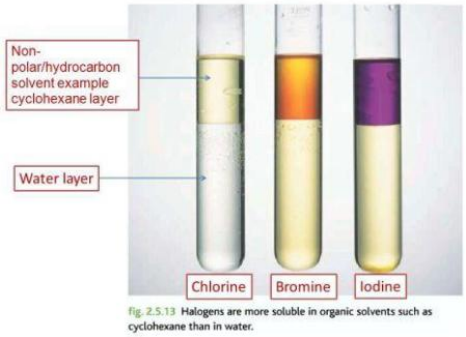
Give the colours and states of the first 4 halogens at Room Temperature? And what is the mnemonic to remember the colours	F_2 - Pale yellow Gas Cl, - Green - Gas Br_2 - Red-brown - Liquid I_2 - Grey - Solid Remember: You Guys Read Gore. YELLOW GREEN RED GREY (down the group)
What is the displacement of group 7 elements ?	More reactive halogen will displace a less reactive halide from its aqueous solution

	
Give the test for halides with a precaution and example equation	1. Add **ACIDIFIED** silver nitrate solution 2. If the precipitate formed is white its silver chloride if its cream then its silver bromide and if its pale yellow then it is silver iodide  $Ag^+(aq) + Br^-(aq) \rightarrow AgBr(s)$ *To remember it learn the halides in alphabetical order **BCI** then the colours in alphabetical order **CWY*** *You could add instead nitric acid (to dissolve any carbonates aka a false positive which can mask desired observations) and silver nitrate solution*
How can you be certain of the result of the halide test?	1. Add **CONCENTRATED** ammonia solution 2. Silver chloride precipitate dissolves 3. Silver bromide dissolves partially 4. Silver iodide does not dissolve at all  *You must say CONCENTRATED as dilute is not allowed see below*

	(ii) Describe what the student would do to the precipitates to distinguish between the halide ions in tubes **A** and **B**. State the expected results. .... **[2]** **(e)** **(ii)** Add concentrated ammonia (solution) ✓ — **2** — **1.2 x 2** Bromide (partially) soluble **AND** iodide insoluble **AW** ✓ — MP2 depends on use of ammonia
Why must experiments with halogens be done in a well-ventilated area?	They are powerful oxidising agents -> toxic
How will Br_2 and I_2 appear when in **cyclohexane** compared to **water**?	• Br_2 is orange in both • I_2 is orange/brown in water and violet in cyclohexane  fig. 2.5.13 Halogens are more soluble in organic solvents such as cyclohexane than in water. *Br_2 being orange can be remembered by bromine water being orange*

What is the colour of chlorine when in water (aqueous) and in an organic solvent such as cyclohexane?	● Water (Aqueous) - Pale green ● Cyclohexane (Organic solvent) - Pale green   fig. 2.5.13 Halogens are more soluble in organic solvents such as cyclohexane than in water.

What is the colour of bromine when in water (aqueous) and in an organic solvent such as cyclohexane?	● Water (Aqueous) - Yellow ● Cyclohexane (Organic solvent) - Orange   fig. 2.5.13 Halogens are more soluble in organic solvents such as cyclohexane than in water.

What is the colour of iodine when in water (aqueous) and in an organic solvent such as cyclohexane?	• Water (Aqueous) - Brown • Cyclohexane (Organic solvent) - Purple   fig. 2.5.13 Halogens are more soluble in organic solvents such as cyclohexane than in water.
What is the best and worst oxidising agent out of the halogens and why?	F_2 best and I_2 worst because its how easily a halogen can gain an electron
What is the best and worst reducing agent out of the halides and why?	I^- best and F^- worst because its how easily a halide can loss an electron
What is produced when Sodium halides (Chloride,Bromide,iodide) react with sulfuric acid and is it a redox reaction?	• White misty fumes (of HCl, HBr and HI) • Not redox • Its an impure product with NaBr and NaI and so H2S, SO2 or S are made E.g $8NaI + H_2SO_4 \rightarrow Na_2SO_4 + 4I_2 + H_2S + 4H_2O$

Hydrogen Halides can be made using Ionic Halides

1) You can make a hydrogen halide by adding a **concentrated acid**, to a solid, **ionic halide**
2) For example, to make **hydrogen chloride** (HCl), add **concentrated phosphoric acid** (H_3PO_4) to **sodium chloride**:

$$NaCl + H_3PO_4 \rightarrow HCl + NaH_2PO_4$$

Ionic equation: $Cl^- + H_3PO_4 \rightarrow HCl + H_2PO_4^-$

You don't need to learn the equations for the reaction of ionic halides with phosphoric acid — this is just here to show you what's going on.

3) **All hydrogen halides** can be made this way, using an **ionic halide** and **concentrated phosphoric acid**.
4) Things get more complicated if you try to use **concentrated sulfuric acid** (H_2SO_4) to make hydrogen halides though. Unlike phosphoric acid, sulfuric acid is an **oxidising agent**, so it can get involved in redox reactions.
5) You **can** make **hydrogen chloride** using sulfuric acid:

$$NaCl + H_2SO_4 \rightarrow HCl + NaHSO_4$$

Ionic equation: $Cl^- + H_2SO_4 \rightarrow HCl + HSO_4^-$

6) You **can't** make either **hydrogen bromide** or **hydrogen iodide** using sulfuric acid.
7) When **sodium bromide** or **sodium iodide** react with **sulfuric acid**, the bromide or iodide ions are **oxidised** to make **bromine** or **iodine** gas.
8) This is because iodine and bromine are strong enough **reducing agents** to **reduce** sulfuric acid.
9) When you add **sulfuric acid** to **sodium bromide**, the **bromide ions** are oxidised to **bromine** gas and the **sulfuric acid** is reduced from **sulfuric acid** (oxidation state of S = +6) to **sulfur dioxide** (oxidation state of S = +4).

$$2NaBr + 2H_2SO_4 \rightarrow Na_2SO_4 + Br_2 + SO_2 + H_2O$$

Ionic equation: $H_2SO_4 + 2H^+ + 2Br^- \rightarrow Br_2 + SO_2 + 2H_2O$

10) **Iodine** is such a strong reducing agent that when you add **sulfuric acid** to **sodium iodide** it reduces it all the way from **sulfuric acid** (oxidation state of S = +6) to **hydrogen sulfide** (oxidation state of S = –2).

$$8NaI + 5H_2SO_4 \rightarrow 4Na_2SO_4 + 4I_2 + H_2S + 4H_2O$$

Ionic equation: $H_2SO_4 + 8H^+ + 8I^- \rightarrow 4I_2 + H_2S + 4H_2O$

Which Hydrogen halides do not react with sulfuric acid to make halides?	• HCl and HBr
What is the impurity balanced equation for if SO_2 forms from the reaction of Hydrogen Bromide with H_2SO_4? And what colour substance is formed?	• $2HBr + H_2SO_4 \rightarrow Br_2 + SO_2 + 2H_2O$ • (Orange Vapour) • Its both the ionic equation for when NaBr and H2SO4, and the equation when HBr reacts with H2SO4

Some Hydrogen Halides react with Sulfuric Acid

1) Hydrogen fluoride and hydrogen chloride **don't** react with **sulfuric acid** — they're not strong enough **reducing agents** to reduce the sulfur.
2) Hydrogen bromide and hydrogen iodide **do** react with sulfuric acid though.
3) The good news is that these reactions are similar to the sodium halide and sulfuric acid reactions on the last page:

HBr reduces H_2SO_4 to SO_2: $2HBr + H_2SO_4 \rightarrow Br_2 + SO_2 + 2H_2O$
HI reduces H_2SO_4 to H_2S: $8HI + H_2SO_4 \rightarrow 4I_2 + H_2S + 4H_2O$

What is the impurity balanced equation for if SO_2 forms from the reaction of Hydrogen Iodide with H_2SO_4	1. $2HI + H_2SO_4 \rightarrow I_2 + SO_2 + 2H_2O$ 2. Its both the ionic equation for when NaI and H2SO4, and the equation when HI reacts with H2SO4 ***Some Hydrogen Halides react with Sulfuric Acid*** 1) Hydrogen fluoride and hydrogen chloride **don't** react with **sulfuric acid** — they're not strong enough **reducing agents** to reduce the sulfur. 2) Hydrogen bromide and hydrogen iodide **do** react with sulfuric acid though. 3) The good news is that these reactions are similar to the sodium halide and sulfuric acid reactions on the last page: HBr reduces H_2SO_4 to SO_2: $2HBr + H_2SO_4 \rightarrow Br_2 + SO_2 + 2H_2O$ HI reduces H_2SO_4 to H_2S: $8HI + H_2SO_4 \rightarrow 4I_2 + H_2S + 4H_2O$
What is the impurity balanced equation for if S forms from the reaction of Hydrogen Iodide with H_2SO_4 and colours of substance produced	● $6HI + H_2SO_4 \rightarrow 3I_2 + S + 4H_2O$ ● (Yellow solid of S produced) ● Its both the ionic equation for when NaI and H2SO4, and the equation when HI reacts with H2SO4 ***Some Hydrogen Halides react with Sulfuric Acid*** 1) Hydrogen fluoride and hydrogen chloride **don't** react with **sulfuric acid** — they're not strong enough **reducing agents** to reduce the sulfur. 2) Hydrogen bromide and hydrogen iodide **do** react with sulfuric acid though. 3) The good news is that these reactions are similar to the sodium halide and sulfuric acid reactions on the last page: HBr reduces H_2SO_4 to SO_2: $2HBr + H_2SO_4 \rightarrow Br_2 + SO_2 + 2H_2O$ HI reduces H_2SO_4 to H_2S: $8HI + H_2SO_4 \rightarrow 4I_2 + H_2S + 4H_2O$
What is the impurity balanced equation for if H_2S forms from the reaction of Hydrogen Iodide with H_2SO_4	● $8HI + H_2SO_4 \rightarrow 4I_2 + H_2S + 4H_2O$ ● (Rotten egg smell) ● Its both the ionic equation for when NaI and H2SO4, and the equation when HI reacts with H2SO4 ***Some Hydrogen Halides react with Sulfuric Acid*** 1) Hydrogen fluoride and hydrogen chloride **don't** react with **sulfuric acid** — they're not strong enough **reducing agents** to reduce the sulfur. 2) Hydrogen bromide and hydrogen iodide **do** react with sulfuric acid though. 3) The good news is that these reactions are similar to the sodium halide and sulfuric acid reactions on the last page: HBr reduces H_2SO_4 to SO_2: $2HBr + H_2SO_4 \rightarrow Br_2 + SO_2 + 2H_2O$ HI reduces H_2SO_4 to H_2S: $8HI + H_2SO_4 \rightarrow 4I_2 + H_2S + 4H_2O$
Which acid is used instead of Sulfuric acid to produce pure HBr and pure HI?	Phosphoric acid (H_3PO_4) ***Hydrogen Halides can be made using Ionic Halides*** 1) You can make a hydrogen halide by adding a **concentrated acid**, to a solid, **ionic halide** 2) For example, to make **hydrogen chloride** (HCl), add **concentrated phosphoric acid** (H_3PO_4) to **sodium chloride**: $NaCl + H_3PO_4 \rightarrow HCl + NaH_2PO_4$ Ionic equation: $Cl^- + H_3PO_4 \rightarrow HCl + H_2PO_4^-$ You don't need to learn the equations for the reaction of ionic halides with phosphoric acid — this is just here to show you what's going on.
What is the trend in thermal stability of the hydrogen halides as you go down group 7 and why	● Thermal stability decreases as bond length increases -> bond strength between the hydrogen and halide decreases -> less energy is needed to break the bond *Therefore HCl would have a higher average bond enthalpy and be more thermally stable compared to HI*

What is the equation for a Hydrogen Halide (Chloride) reacting with ammonia? (With state symbols?) and what colour fumes are produced	$HCl\ (g) + NH_3\ (g) \rightarrow NH_4Cl\ (s)$ (White fumes) ***Hydrogen Halides** react with **Ammonia*** 1) **Ammonia** (NH_3) is a **base**, so it can **accept a proton** to form the positively charged **ammonium ion** (NH_4^+) 2) The ammonium ion can bond with a negative **halide ion**, to produce an **ammonium halide**: $HF_{(aq)} + NH_{3(aq)} \rightarrow NH_4F_{(aq)}$ $HBr_{(aq)} + NH_{3(aq)} \rightarrow NH_4Br_{(aq)}$ $HCl_{(aq)} + NH_{3(aq)} \rightarrow NH_4Cl_{(aq)}$ $HI_{(aq)} + NH_{3(aq)} \rightarrow NH_4I_{(aq)}$
Explain the benefits and disadvantages of using chlorine to treat drinking water. Include references to the transport and storage of chlorine (Any 5 points)	1. Kills bacteria/disinfectant 2. Cheap compared to other water treatment chemicals 3. Chlorine is a gas /making it difficult to contain/ so needs a strong container 4. Toxic/poisonous 5. Causes breathing problems 6. Forms by products 7. Dissolves in rivers /local water supplies, (dissolves in water) Forming bleach and acid (bleach and acid) kill life forms in the water
Give 3 large scale uses for the chlorine that is formed from brine/seawater?	1. Bleach 2. Disinfectant /killing bacteria / sterilising 3. Extraction of bromine 4. Water treatment 5. Making PVC 6. Making solvents 7. Making HCl 8. Making medicines 9. Making pesticides 10. Make CFC's
Give one safety precaution that must be taken when working with chlorine gas?	1. Well ventilated area 2. Fume cupboard 3. Breathing apparatus (say this as last resort as is not all mark schemes)
How would you test for a **halogen**? (1)	● Add organic solvent to see the halogens colour (1) ● Heat solution to see the colour of the halogens vapour (1) *NOT HALIDE so no silver nitrate solution easy mistake*

ES.o-q - Equilibria | ES4 | ES7 |

What is a closed system?	A container in which nothing can enter or leave except for heat

What is dynamic equilibrium?	● The rate of the forward reaction is equal to the rate of the backward reaction ● The concentration of reactants/products remain constant in a closed system
What is Le Chatelier's Principle?	If a dynamic equilibrium is changed the position of the equilibrium will oppose this change
What happens to the equilibrium position if the temperature is increased and why?	● Favours the endothermic reaction ● To minimise the effect of temperature rise by absorbing heat
What happens to the equilibrium position if pressure is increased?	● Favours the side producing the least moles of a gas ● To minimise the effect of pressure increase by reducing the number of particles *Remember that each mole takes 24dm^3 under standard conditions!*
What is the equation for the equilibrium constant (k_c)?	aA + bB <-> cC + dD $K_c = \frac{[C]^c [D]^d}{[A]^a [B]^b}$
What does it mean if the value for K_C is less than 1?	More reactants than products and so position of equilibrium shifts to the left *This means that at equilibrium most of the products have been converted to reactant but not all*
What does it mean if the value for K_C is greater than 1?	More products than reactants and so position of equilibrium shifts to the right *This means that at equilibrium most of the reactants have been converted to products but not all*