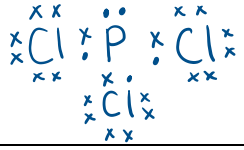
Retrieval Practice: Year 12 Number 11

Rules: Never look at your notes for retrieval practice! Do as many as you can, even if they are educated guesses. When you have tried (hard!) to answer them all, check the mark scheme and rate each question:

- Easy, remembered perfectly
- Harder – could remember part of it or was familiar when I saw the answer
- Very hard – didn't recognise the answer so need to go back over this

	Question	Rating
1	Write a balanced equation for the incomplete combustion of propane to form carbon monoxide and water	
2	Draw a dot and cross diagram to show the bonding in phosphorous trichloride	
3	Write an ionic equation for the reaction between sulfuric acid and sodium hydroxide	
4	Define exothermic	
5	Calculate the number of moles of hydroxide ions in 23.5 cm^3 of a 0.15 $moldm^{-3}$ solution of barium hydroxide	
6	Explain why graphite has a much higher boiling point than carbon dioxide	
7	Identify the limiting reagent when 0.60 g magnesium reacts with 0.48 g oxygen gas	
8	Explain why sodium is more reactive than lithium	
9	Give the formulae of a positive ion and a negative ion that have the same electron configuration as neon	
10	Write an equation, including state symbols, for the first ionisation energy of oxygen	

Answers:

	Question
1	Write a balanced equation for the incomplete combustion of propane to form carbon monoxide and water $C_3H_8 + 3.5\ O_2 \rightarrow 3\ CO + 4\ H_2O$
2	Draw a dot and cross diagram to show the bonding in phosphorous trichloride 
3	Write an ionic equation for the reaction between sulfuric acid and sodium hydroxide $H^+ (aq) + OH^- (aq) \rightarrow H_2O (l)$
4	Define exothermic *A reaction/process that releases heat energy to the surroundings*
5	Calculate the number of moles of hydroxide ions in 23.5 cm^3 of a 0.15 $moldm^{-3}$ solution of barium hydroxide *Moles $Ba(OH)_2 = 0.15 \times 0.0235 = 3.525 \times 10^{-3}$* *Moles $OH^- = 3.525 \times 10^{-3} \times 2 = 7.05 \times 10^{-3}$*
6	Explain why graphite has a much higher boiling point than carbon dioxide • *Graphite has a giant covalent structure* • *Need to break strong covalent bonds - lots of energy required* • *Carbon dioxide is covalent molecular / simple covalent* • *Only need to overcome weak intermolecular forces - less energy required*
7	Identify the limiting reagent when 0.60 g magnesium reacts with 0.48 g oxygen gas *Equation: $2Mg + O_2 \rightarrow 2MgO$* *Moles Mg = 0.60 / 24.3 = 0.0247* *→ this would need at least 0.01235 moles oxygen to fully react* *Moles $O_2 = 0.48 / 32 = 0.015$* *0.015 is more than 0.01235, so oxygen is in excess and magnesium is the limiting reagent*
8	Explain why sodium is more reactive than lithium • *Sodium has another shell of electrons* • *Increased atomic radius and shielding compared to lithium* • *Attraction between outer electron and nucleus is weaker for sodium* • *So the electron is easier to remove/first IE is lower*
9	Give the formulae of a positive ion and a negative ion that have the same electron configuration as neon *Positive ions: Na^+, Mg^{2+}, Al^{3+}* *Negative ions: F^-, O^{2-}, N^{3-}*
10	Write an equation, including state symbols, for the first ionisation energy of oxygen $O (g) \rightarrow O^+ (g) + e^-$