Retrieval Practice: Year 12 Number 5

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	Define oxidation and reduction in terms of electrons	☺ ☹ ☹
2	Given the bond energy values below, calculate the enthalpy change for this reaction: $H_2 + Cl_2 \rightarrow 2HCl$ Values in kJmol^{-1}: H-H 436, Cl-Cl 243, H-Cl 432	☺ ☹ ☹
3	Explain why the first ionisation energy of sulfur is slightly lower than the first ionisation energy of phosphorous	☺ ☹ ☹
4	Describe the test for carbon dioxide gas	☺ ☹ ☹
5	Calculate the number of moles of gas present if the gas occupies a volume of 500 cm^3 at 50°C and 200 kPa pressure (R = 8.31 Jmol^{-1}K^{-1}). Give your answer to 3SF.	☺ ☹ ☹
6	Give the general formula of an alkane	☺ ☹ ☹
7	Calculate the concentration of a solution of calcium hydroxide if 25cm^3 of the solution required 13.6cm^3 0.100 moldm^{-3} solution of hydrochloric acid to neutralise it	☺ ☹ ☹
8	Give the formula of iron (III) nitrate	☺ ☹ ☹
9	Calculate the M_r of hydrated copper (II) sulfate, $CuSO_4.5H_2O$	☺ ☹ ☹
10	Define relative atomic mass	☺ ☹ ☹

Answers:

	Question
1	Define oxidation and reduction in terms of electrons *Oxidation is the loss of electrons, reduction is the gain of electrons*
2	Given the bond energy values below, calculate the enthalpy change for this reaction: $H_2 + Cl_2 \rightarrow 2HCl$ Values in $kJmol^{-1}$: H-H 436, Cl-Cl 243, H-Cl 432 Enthalpy change = (436 + 243) – (2 x 432) = -185 $kJmol^{-1}$
3	Explain why the first ionisation energy of sulfur is slightly lower than the first ionisation energy of phosphorous *Electron removed from sulfur ($3p^4$) is paired; electron removed from phosphorous ($3p^3$) is unpaired. Repulsion between paired electrons makes the electron from sulfur slightly easier/lower energy to remove.*
4	Describe the test for carbon dioxide gas
5	Calculate the number of moles of gas present if the gas occupies a volume of 500 cm^3 at 50°C and 200 kPa pressure (R = 8.31 $Jmol^{-1}K^{-1}$). Give your answer to 3SF. *P = 200 000 Pa V = 5 x 10^{-4} m^3 T = 323 K* *n = PV/RT = 0.0373 (be careful of rounding!)*
6	Give the general formula of an alkane *C_nH_{2n+2}*
7	Calculate the concentration of a solution of calcium hydroxide if 25cm^3 of the solution required 13.6cm^3 0.100 $moldm^{-3}$ solution of hydrochloric acid to neutralise it *Moles HCl = 0.1 x 0.0136 = 1.36 x 10^{-3}* *Moles Ca(OH)$_2$ = 6.8 x 10^{-4}* *Concentration Ca(OH)$_2$ = 6.8 x 10^{-4} / 0.025 = 0.0272 $moldm^{-3}$*
8	Give the formula of iron (III) nitrate *$Fe(NO_3)_3$*
9	Calculate the M_r of hydrated copper (II) sulfate, $CuSO_4.5H_2O$ *M_r $CuSO_4$ = 159.6 + 5 x 18 = 249.6*
10	Define relative atomic mass • *the (weighted) mean/average mass of an **atom*** • *on a scale where one ^{12}C atom = 12/ compared to $1/12^{th}$ of a ^{12}C atom*