GCSE Chemistry A (Gateway Science)

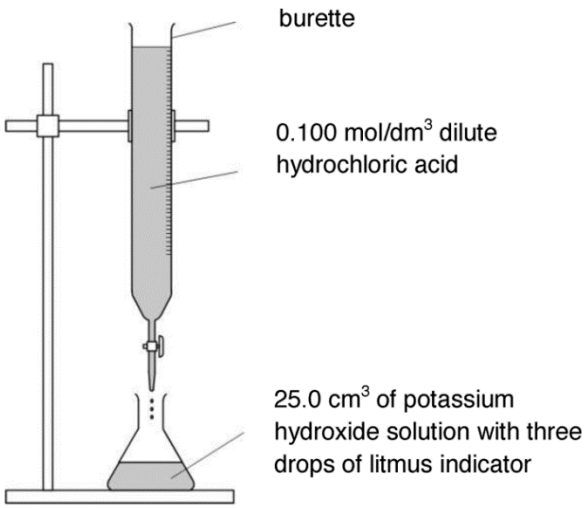
J248/04 Chemistry A C4-C6 and C7 (Higher Tier)

Question Set 21

1 Astudent does three titrations with dilute hydrochloric acid and potassium hydroxide solution.

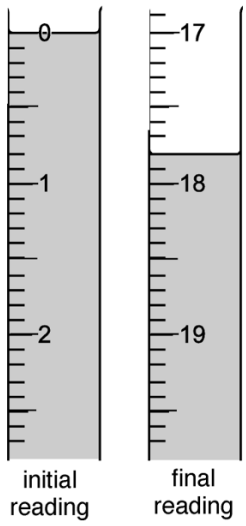
Hydrochloric acid neutralises the alkali potassium hydroxide.

$HCl(aq) + KOH(aq) \rightarrow KCl(aq) + H_2O(l)$



Look at the diagrams. They show parts of the burette during the first titration.

First titration



Here is the student's results table.

Titration number	1	2	3
Final reading (cm^3)	17.8	37.5	32.1
Initial reading (cm^3)	0.0	20.4	15.0
Titre (volume of acid added) (cm^3)	17 8	17.1	17.1

(a) Using the diagrams and table, calculate the mean titre.

Explain your answer.

17.8 is anomalous ⇒ mean = $\frac{17.1 + 17.1}{2}$

= 17.1

Answer = 17.1 cm^3 **[2]**

(b) The student uses 25.0 cm^3 of potassium hydroxide solution, KOH.

She also uses hydrochloric acid with a concentration of 0.100 mol/dm^3.

Calculate the concentration, in mol/dm^3, of the KOH(aq).

$n_{acid} = cV = 0.1 \times 17.1 \times 10^{-3} = 1.71 \times 10^{-3}$ mol

$\Rightarrow n_{alkali} = 1.71 \times 10^{-3}$

$\Rightarrow c = \frac{n}{V} = \frac{1.71 \times 10^{-3}}{25 \times 10^{-3}} = 0.0684$

Answer = 0.0684 mol/dm^3 **[2]**

(c) Use your answer to **(b)** to calculate the concentration of the KOH(aq) in g/dm^3.

$m = mr \times n = 56.1 \times 0.0684 = 3.84$

Answer = 3.84 g/dm^3 **[2]**

Total Marks for Question Set 21: 6

The Periodic Table of the Elements

(1)	(2)											(3)	(4)	(5)	(6)	(7)	(0)
1																	18
1 **H** hydrogen 1.0	2											13	14	15	16	17	2 **He** helium 4.0
3 **Li** lithium 6.9	4 **Be** beryllium 9.0											5 **B** boron 10.8	6 **C** carbon 12.0	7 **N** nitrogen 14.0	8 **O** oxygen 16.0	9 **F** fluorine 19.0	10 **Ne** neon 20.2
11 **Na** sodium 23.0	12 **Mg** magnesium 24.3	3	4	5	6	7	8	9	10	11	12	13 **Al** aluminium 27.0	14 **Si** silicon 28.1	15 **P** phosphorus 31.0	16 **S** sulfur 32.1	17 **Cl** chlorine 35.5	18 **Ar** argon 39.9
19 **K** potassium 39.1	20 **Ca** calcium 40.1	21 **Sc** scandium 45.0	22 **Ti** titanium 47.9	23 **V** vanadium 50.9	24 **Cr** chromium 52.0	25 **Mn** manganese 54.9	26 **Fe** iron 55.8	27 **Co** cobalt 58.9	28 **Ni** nickel 58.7	29 **Cu** copper 63.5	30 **Zn** zinc 65.4	31 **Ga** gallium 69.7	32 **Ge** germanium 72.6	33 **As** arsenic 74.9	34 **Se** selenium 79.0	35 **Br** bromine 79.9	36 **Kr** krypton 83.8
37 **Rb** rubidium 85.5	38 **Sr** strontium 87.6	39 **Y** yttrium 88.9	40 **Zr** zirconium 91.2	41 **Nb** niobium 92.9	42 **Mo** molybdenum 95.9	43 **Tc** technetium	44 **Ru** ruthenium 101.1	45 **Rh** rhodium 102.9	46 **Pd** palladium 106.4	47 **Ag** silver 107.9	48 **Cd** cadmium 112.4	49 **In** indium 114.8	50 **Sn** tin 118.7	51 **Sb** antimony 121.8	52 **Te** tellurium 127.6	53 **I** iodine 126.9	54 **Xe** xenon 131.3
55 **Cs** caesium 132.9	56 **Ba** barium 137.3	● 57–71 lanthanoids	72 **Hf** hafnium 178.5	73 **Ta** tantalum 180.9	74 **W** tungsten 183.8	75 **Re** rhenium 186.2	76 **Os** osmium 190.2	77 **Ir** iridium 192.2	78 **Pt** platinum 195.1	79 **Au** gold 197.0	80 **Hg** mercury 200.6	81 **Tl** thallium 204.4	82 **Pb** lead 207.2	83 **Bi** bismuth 209.0	84 **Po** polonium	85 **At** astatine	86 **Rn** radon
87 **Fr** francium	88 **Ra** radium	● 89–103 actinoids	104 **Rf** rutherfordium	105 **Db** dubnium	106 **Sg** seaborgium	107 **Bh** bohrium	108 **Hs** hassium	109 **Mt** meitnerium	110 **Ds** darmstadtium	111 **Rg** roentgenium	112 **Cn** copernicium		114 **Fl** flerovium		116 **Lv** livermorium		

Key
atomic number
Symbol
name
relative atomic mass