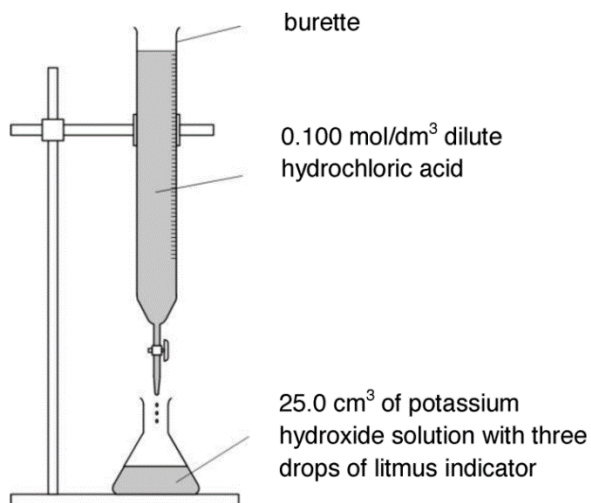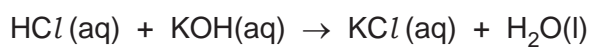# GCSE Chemistry A (Gateway Science)
**J248/04** Chemistry A C4-C6 and C7 (Higher Tier)

Question Set 21

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

Hydrochloric acid neutralises the alkali potassium hydroxide.

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

burette

0.100 mol/dm^3 dilute hydrochloric acid

25.0 cm^3 of potassium hydroxide solution with three drops of litmus indicator

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

First titration

initial reading
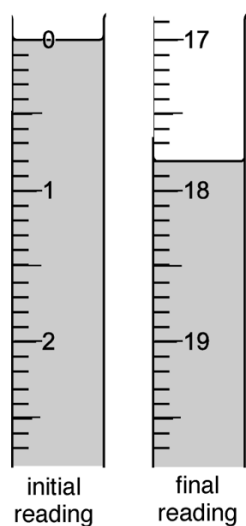
final reading

Here is the student's results table.

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

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

Explain your answer.

....

....

Answer = ………………………………. 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).

Answer = …………………………………. mol/dm^3 **[2]**

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

Answer = …………………………………. g/dm^3 **[2]**

Total Marks for Question Set 21: 6

Resource Materials

The Periodic Table of the Elements

Key
atomic number
Symbol
name
relative atomic mass

(1)	(2)												(3)	(4)	(5)	(6)	(7)	(0)
1 **H** hydrogen 1.0	**2**												**13**	**14**	**15**	**16**	**17**	**18** 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		