**How do we work out Titration Calculations**

Things to Remember:



|  |
| --- |
| 1. litre = 1 dm3= 1000 cm3 or 1000 ml.
 |

Question: 13.5 cm3 of a solution of hydrochloric acid was titrated with a solution of potassium hydroxide of a concentration of 3.65 g dm-3. 10.0 cm3 of the potassium hydroxide was required for neutralization. Calculate the concentration of the hydrochloric acid solution.

**Step 1: Work out the values that are given**

Volume of Reactant 1 [Potassium Hydroxide]: 10 cm3

Volume of Reactant 2 [Hydrochloric Acid]: 13.5 cm3

Concentration of Reactant 1 [KOH]: 3.65 g/dm3

Concentration of Reactant 2 [HCl]: unknown

**Step 2: Write the balance equation and work out the RfM [relative formula mass] of the reactants**

KOH + HCl KCl + H2O

56 36.5 [RfM otherwise know as the theoretical mass]

**Step 3: Work out the mass of KOH as we know the concentration and volume and can use the equation above**

Mass [g] =Volume [dm3] X concentration [g/dm3]

Mass = 10/1000 *[to get it into dm3]* X 3.65

Mass =0.0365 g *[always write this to the 3 or 4 decimal place]*

**Step 4: Now, you know the actual mass of KOH in 10cm3 you can work out the mass of HCl in 13.5cm3 by dividing the actual mass by the theoretical mass and multiplying it by the theoretical mass of HCl.**

[0.0365 / 56] X 36.5 = .0238 g of HCl in 13.5 cm3

**Step 5: Now you know the mass of HCl and volume you can work out the concentration.**

Mass /Volume =Concentration

0.0238/[13.5/1000] *[remember-need to change cm3 to dm3 by dividing by 1000]* = 1.76 g/dm3 of HCl