More complex Titration for gcse Chemnistry

1. 20.0 cm3 of hydrochloric acid (HCl) was neutralized by 25.5 cm3 of 0.100 mol/dm3 potassium hydroxide (KOH) solution. Calculate the concentration of the HCl in mol/dm3.
   - Equation: $HCl(aq) + KOH(aq) \rightarrow KCl(aq) + H_2O(l)$

2. A student titrated 25.0 cm3 of sulfuric acid (H_2SO_4) with 0.150 mol/dm3 sodium hydroxide (NaOH) solution. The average titre was 18.6 cm3. Calculate the concentration of the sulfuric acid in mol/dm3.
   - Equation: $2NaOH(aq) + H_2SO_4(aq) \rightarrow Na_2SO_4(aq) + 2H_2O(l)$

3. A solution of nitric acid (HNO_3) has a concentration of 0.250 mol/dm3. 25.0 cm3 of this solution was required to neutralize 15.8 cm3 of barium hydroxide ($Ba(OH)_2$) solution. Calculate the concentration of the barium hydroxide solution in mol/dm3.
   - Equation: $2HNO_3(aq) + Ba(OH)_2(aq) \rightarrow Ba(NO_3)_2(aq) + 2H_2O(l)$

4. A chemist titrated 20.0 cm3 of ammonia solution (NH_3) with 0.200 mol/dm3 hydrochloric acid (HCl). It took 15.5 cm3 of the acid to reach the end point. Calculate the concentration of the ammonia solution in mol/dm3.
   - Equation: $NH_3(aq) + HCl(aq) \rightarrow NH_4Cl(aq)$

5. A titration was carried out using 25.0 cm3 of 0.100 mol/dm3 potassium hydroxide (KOH) solution and ethanoic acid (CH_3COOH). The average titre was 31.2 cm3. Calculate the concentration of the ethanoic acid in mol/dm3.

- Equation: $CH_3COOH(aq) + KOH(aq) \rightarrow CH_3COOK(aq) + H_2O(l)$

6. A student used 22.8 cm^3 of 0.125 mol/dm^3 sodium hydroxide ($NaOH$) solution to neutralize 25.0 cm^3 of a solution of phosphoric acid (H_3PO_4). Calculate the concentration of the phosphoric acid in mol/dm^3.
   - Equation: $3NaOH(aq) + H_3PO_4(aq) \rightarrow Na_3PO_4(aq) + 3H_2O(l)$

7. In a titration, 17.6 cm^3 of 0.100 mol/dm^3 sulfuric acid (H_2SO_4) was needed to neutralize 25.0 cm^3 of a solution of potassium carbonate (K_2CO_3). Calculate the concentration of the potassium carbonate solution in mol/dm^3.
   - Equation: $H_2SO_4(aq) + K_2CO_3(aq) \rightarrow K_2SO_4(aq) + H_2O(l) + CO_2(g)$

8. A solution of hydrobromic acid (HBr) has a concentration of 0.150 mol/dm^3. 20.0 cm^3 of this solution neutralized 27.5 cm^3 of lithium hydroxide ($LiOH$) solution. What is the concentration of the lithium hydroxide solution in mol/dm^3?
   - Equation: $HBr(aq) + LiOH(aq) \rightarrow LiBr(aq) + H_2O(l)$

9. A student titrated 25.0 cm^3 of a solution of sodium hydrogencarbonate ($NaHCO_3$) with 0.100 mol/dm^3 nitric acid (HNO_3). The average titre was 21.8 cm^3. Calculate the concentration of the sodium hydrogencarbonate solution in mol/dm^3.
   - Equation: $NaHCO_3(aq) + HNO_3(aq) \rightarrow NaNO_3(aq) + H_2O(l) + CO_2(g)$

10. In a titration, 18.5 cm^3 of 0.200 mol/dm^3 potassium hydroxide (KOH)

solution was needed to neutralize 25.0 cm3 of a solution of butanoic acid (C_3H_7COOH). Calculate the concentration of the butanoic acid solution in mol/dm3.

- Equation: $C_3H_7COOH(aq) + KOH(aq) \rightarrow C_3H_7COOK(aq) + H_2O(l)$