Molarity and Stoichiometry Worksheet

1. Calculate the volume of 2.00 M HNO3 solution required to react with 216 grams of Ag according to the equation:

3 Ag(s) + 4 HNO3(aq)  3 AgNO3(aq) + NO(g) + 2 H2O(l)

1. Calculate the minimum volume of 0.500 M NaOH required to react exactly with 3.0 grams of acetic acid. The equation is:

NaOH(aq) + HC2H3O2(aq)  NaC2H3O2(aq) + H2O(l)

1. Calculate the mass of AgCl formed when 0.200 L of 0.200 M AgNO3 reacts with an excess of CaCl2. The equation is:

2 AgNO3(aq) + CaCl2(aq)  2 AgCl(s) + Ca(NO3)2(aq)

1. Calculate the mass of BaSO4 formed when excess 0.200 M Na2SO4 solution is added to 0.500 L of 0.500 M BaCl2 solution.
2. \*\*A sample of impure sodium chloride weighing 1.00 grams is dissolved in water and completely reacted with silver nitrate solution. The dried precipitate of AgCl has a mass of 1.48 grams. Calculate the percentage of NaCl in the original impure sample.
3. \*\*To neutralize the acid in 10.0 mL of 18.0 M H2SO4 that was accidentally spilled on a laboratory bench top, solid sodium bicarbonate was used. The container of sodium bicarbonate was known to weigh 155.0 g before this use and out of curiosity its mass was measured as 144.5 g afterwards. The reaction that neutralizes sulphuric acid this

way is as follows:

H2SO4 + 2 NaHCO3  Na2SO4 + 2 CO2 + 2 H2O

Was sufficient sodium bicarbonate used? (HINT: This is a limiting reactant question).

Answers

1. **1.34x103 ml HNO3**
2. **0.0999L or 100ml NaOH**
3. **5.73 g AgCl**
4. **58.3 g BaSO4**
5. **(0.603 g pure NaCl/1.00 g impure NaCl) x 100% = 60%**
6. **Sufficient NaHCO3 was used because all the H2SO4 was used up in this reaction. H2SO4 is the limiting reagent (L.R.) and 0.18 mol was used up. The maximum yield of NaSO4 is 25.6 g.**