

1. What is the concentration (in mol/L) of a solution prepared by dissolving 2.57 grams of Na_2S in enough water to make 100.0 mL of solution?

$$\frac{2.57 \text{ g}}{78.05 \text{ g/mol}} = 0.03293 \text{ mol Na}_2\text{S}$$

$$[\text{Na}_2\text{S}] = \frac{0.03293 \text{ mol}}{0.1000 \text{ L}} = 0.329 \text{ M}$$

2. How many grams of ammonium chloride (NH_4Cl) are dissolved in 25.00 L of a solution that is 2.00 M NH_4Cl ?

$$\frac{25.00 \text{ L} \times 2.00 \text{ mol NH}_4\text{Cl}}{1 \text{ L soln}} = 53.50 \text{ g} = 2670 \text{ g}$$

3. Describe the preparation of one liter of a 0.500 M NaCl solution from solid sodium chloride and the other materials and glassware needed.

$$\frac{1.00 \text{ L} \times 0.500 \text{ mol}}{1 \text{ L}} = 58.44 \text{ g} = 29.2 \text{ g NaCl needed}$$

* Mass out 29.2 g of solid sodium chloride. Put it in a 1.00 L volumetric flask and add enough water to make 1.00 L of solution

4. What is the percent by mass of aluminum chloride (AlCl_3) prepared by dissolving 26.8 g in 355.0 mL of water? (Assume the density of water is 1.00 g/mL.)

$$\text{mass}\% = \frac{\text{mass AlCl}_3}{\text{mass solution}} \times 100\% = \frac{26.8 \text{ g}}{381.8 \text{ g}} \times 100\% = 7.02\%$$

5. What is the concentration of a solution prepared by diluting 2.50 mL of 1.67 M Na_2SO_4 to a total volume of 50.0 mL?

$$V_1 = 2.50 \text{ mL} \quad V_2 = 50.0 \text{ mL}$$

$$M_1 = 1.67 \text{ M} \quad M_2 = ?$$

$$(2.50 \text{ mL})(1.67 \text{ M}) = (50.0 \text{ mL})(M_2)$$

$$M_2 = [\text{Na}_2\text{SO}_4] = 0.0835 \text{ M}$$

6. What is the ppm concentration of lead in a solution found to contain 1.13 mg Pb^{2+} in 5.00 L? Assume the density of the solution is 1.00 g/mL.

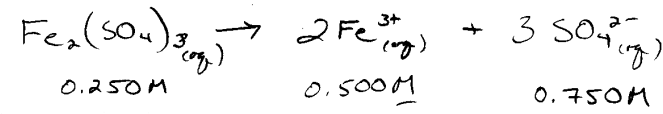
$$\frac{1.13 \text{ mg Pb}^{2+}}{5.00 \times 10^6 \text{ mg}} \times 1.0 \times 10^6 = 0.226 \text{ ppm}$$

7. An aqueous solution is found to be 0.0050 % Ag^+ ions. Calculate the ppm concentration of the solution.

$$\% \text{Ag}^+ = 0.0050 \%$$

$$\frac{\text{mass Ag}^+}{\text{mass soln}} = 0.000050 \times 10^6 = 50. \text{ ppm}$$

8. What is the concentration in mol/L of iron (III) ions and sulfate ions in a solution that is 0.250 M in $\text{Fe}_2(\text{SO}_4)_3$?



9. What is the concentration in mol/L of a solution with 8.52 g MgCl_2 dissolved in 150.0 mL of solution?

$$\frac{8.52 \text{ g}}{95.21 \text{ g/mol}} = 0.08949 \text{ mol} \quad 150.0 \text{ mL} = 0.1500 \text{ L}$$

$$[\text{MgCl}_2] = \frac{0.08949 \text{ mol}}{0.1500 \text{ L}} = 0.597 \frac{\text{mol}}{\text{L}} = 0.597 \text{ M}$$

What is the concentration of Mg^{2+} ions? Cl^- ions?

$$[\text{Mg}^{2+}] = 0.597 \text{ M}$$

$$[\text{Cl}^-] = 1.19 \text{ M}$$