6.5D

Solutions for 6.5C Extra Practice Questions: Dilution

In the following questions, "concentrated" refers to the concentration of the most common commercial reagent as listed in the table of Concentrated Reagents inside the back cover of the textbook.

1. An ammonia solution is made by diluting 150 mL of the concentrated commercial reagent until the final volume reaches 1000 mL. What is the final molar concentration?

$$v_i C_i = v_f C_f$$
$$150\ \text{mL} \times 14.8\ \text{mol/L} = 1000\ \text{mL} \times C_f$$
$$C_f = 2.22\ \text{mol/L}$$

2. What volume of a 500 ppm reagent solution is required to prepare a 2.5 L solution with a 100 ppm concentration?

$$v_i c_i = v_f c_f$$
$$v_i \times 500\ \text{ppm} = 2.5\ \text{L} \times 100\ \text{ppm}$$
$$v_i = 0.50\ \text{L}$$

3. A 500 mL bottle of concentrated acetic acid is diluted to make a 5.0% solution. Find the volume of diluted solution that is prepared.

$$v_i c_i = v_f c_f$$
$$500\ \text{mL} \times 99.5\% = v_f \times 5.0\%$$
$$v_f = 10\ \text{L}$$

4. In a chemical analysis, a 25.0 mL sample was diluted to 500.0 mL and analyzed. If the diluted solution had a molar concentration of 0.108 mol/L, what was the molar concentration of the original sample?

$$v_i C_i = v_f C_f$$
$$25.0\ \text{mL} \times C_i = 500.0\ \text{mL} \times 0.108\ \text{mol/L}$$
$$C_i = 2.16\ \text{mol/L}$$

5. If a 355 mL can of soda pop is diluted to a final volume of 1.00 L, what can be said quantitatively about the concentration of the diluted solution as compared with the original solution?

$$v_i c_i = v_f c_f$$
$$0.355\ \text{L} \times c_i = 1.00\ \text{L} \times c_f$$
$$c_f = 0.355\ c_i$$

The diluted solution has a concentration 0.355 times or 35.5% of the original solution.