

Warm Up

Determine the molar concentration of a solution that contains 47.0 g of CaCl_2 dissolved in 550 mL of water.

$$C = ?$$

$$m = 47.0 \text{ g}$$



$$V = 550 \text{ mL}$$

$$47.0 \text{ g CaCl}_2 \times \frac{1 \text{ mol CaCl}_2}{110.98 \text{ g CaCl}_2} = 0.423 \text{ mol CaCl}_2$$

$$C = \frac{n}{V}$$

$$C = \frac{0.423 \text{ mol}}{0.55 \text{ L}}$$

$$C = 0.77 \text{ mol/L}$$

Check Homework

$$\textcircled{3} V = ?$$

$$C = 0.50 M$$

$$m = 25g \\ \text{Ca(OH)}_2$$

$$\checkmark C = \frac{n \checkmark}{V}$$

$$25g \text{Ca(OH)}_2 \times \frac{1 \text{ mol Ca(OH)}_2}{74.10g \text{Ca(OH)}_2} = 0.337 \text{ mol Ca(OH)}_2$$

$$C = \frac{n}{V}$$

$$0.50 \text{ mol/L} = \frac{0.337 \text{ mol}}{V}$$

$$\frac{(\cancel{0.50 \text{ mol/L}}) V}{(\cancel{0.50 \text{ mol/L}})} = \frac{0.337 \text{ mol}}{0.50 \text{ mol/L}}$$

$$V = 0.67 L$$

$$3 = \frac{6}{x}$$

$$\frac{3x}{3} = \frac{6}{3}$$
$$x = 2$$

Dilutions

Dilution - process of decreasing the concentration of a solution by adding more solvent (normally water).

Calculating new concentration after a dilution...

Start with 250. mL of a 0.15 mol/L solution.

100. mL of water is added to dilute the solution.

Which quantity is the same before and after the dilution?

- moles of solute (n) ? ✓
- volume of solution (V) ? V_F is greater than V_i
- concentration of solution (C) ? C_F is less than C_i

$$n_i = n_F$$

$$V_i C_i = V_F C_F \quad *$$

$$V_i = 250 \text{ mL}$$

$$C_i = 0.15 \text{ mol/L}$$

$$V_F = 350 \text{ mL}$$

$$C_F = ?$$

$$(250 \text{ mL})(0.15 \text{ mol/L}) = (350 \text{ mL})C_F$$

$$C_F = \frac{(250 \text{ mL})(0.15 \text{ mol/L})}{(350 \text{ mL})}$$

$$C_F = 0.11 \text{ mol/L}$$

$$V_i < V_F$$

$$C_i > C_F$$

What would be the concentration of a solution after diluting 45.0 mL of 4.2 mol/L KOH to 250 mL?

Sample Problems

How much 0.20 mol/L glucose solution can be made from 50. mL of 0.50 mol/L glucose solution?

$$\begin{aligned}V_i &= 50. \text{ mL} \\C_i &= 0.50 \text{ mol/L} \\V_F &= ? \\C_F &= 0.20 \text{ mol/L}\end{aligned}$$

$$V_i C_i = V_F C_F$$

$$(50. \text{ mL})(0.50 \text{ mol/L}) = V_F (0.20 \text{ mol/L})$$

$$V_F = \frac{(50. \text{ mL})(0.50 \text{ mol/L})}{(0.20 \text{ mol/L})}$$

$$V_F = 130 \text{ mL}$$

*Today's
Assignment*

Worksheet

p. 484 #12,13

p. 486 #21

p. 499 #52

To Try...

p. 499 #50-55