Check Homework

② $C = ?$

$m = 0.45g$

$V = 265 mL$

$NaNO_3$

$0.45g\ NaNO_3 \times \dfrac{1\ mol\ NaNO_3}{85.00g\ NaNO_3} = 0.00529\ mol$

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

$C = \dfrac{0.00529\ mol}{0.265 L}$

$\boxed{C = 0.020\ M}$

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) ?   ↑ $V_i < V_F$

- concentration of solution (C) ?   ↓ $C_i > C_F$

$$n_i = n_F$$

$$V_i C_i = V_F C_F$$

$V_i = 250. mL$ $(250. mL)(0.15 mol/L) = (350. mL) C_F$

$C_i = 0.15 mol/L$ $C_F = \dfrac{(250. mL)(0.15 mol/L)}{(350. mL)}$

$V_F = 350. mL$

$C_F = ?$ $\boxed{C_F = 0.10 mol/L}$

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

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

$$n = V \times C$$

Sample Problems

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

$V_i = 50.\,mL$

$C_i = 0.50\,mol/L$

$V_F = \;?$

$C_F = 0.20\,mol/L$

$V_i C_i = V_F C_F$

$(50.\,mL)(0.50\,mol/L) = V_F (0.20\,mol/L)$

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

$$\boxed{V_F = 130\,mL}$$

What would be the concentration of a solution made by adding 250 mL of water to 45.0 mL of 4.2 mol/L KOH?

$V_i = 45.0\,mL$

$C_i = 4.2\,mol/L$

$V_F = 295\,mL$

$C_F = \;?$

$V_i C_i = V_F C_F$

$(45.0\,mL)(4.2\,mol/L) = (295\,mL)C_F$

$$\boxed{C_F = 0.64\,mol/L}$$

Today's Assignment

p. 484 #12,13
p. 486 #21
p. 499 #52