Warm Up

What is the volume needed to dissolve 1.89 moles of solute making a 0.948M solution?

$V = ?$

$n = 1.89 \, mol$

$C = 0.948 \, M$
$\quad = 0.948 \, mol/L$

mass

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

$0.948 \, mol/L = \dfrac{1.89 \, mol}{V}$

$\dfrac{(0.948 \, mol/L)V}{0.948 \, mol/L} = \dfrac{1.89 \, mol}{0.948 \, mol/L}$

$\boxed{V = 1.99 \, L}$

Dilutions

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

$$n_i = n_F$$

$$V_i C_i = V_F C_F$$

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

$$n = V \times C$$

Dilutions

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

$V_i = 45.0 \, mL$

$C_i = 4.2 \, mol/L$

$V_F = 250 \, mL$

$C_F = \, ?$

$$V_i C_i = V_F C_F$$

$$\frac{(45.0 \, mL)(4.2 \, mol/L)}{(250 \, mL)} = \frac{(250 \, mL) C_F}{(250 \, mL)}$$

$$\boxed{C_F = 0.76 \, mol/L}$$

Sample Problems

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

$V_i = 50.mL$

$C_i = 0.50 mol/L$

$V_F = ?$

$C_F = 0.20 mol/L$

$$V_i C_i = V_F C_F$$

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

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

Today's Assignment

Worksheet