Check #8-11

(8) $V = 2.0\ L$

$m = 36.0\ g$ $C_6H_{12}O_6$

$C = ?$

$36.0\ g\ C_6H_{12}O_6 \times \frac{1\ mol\ C_6H_{12}O_6}{180\ g\ C_6H_{12}O_6} = 0.200\ mol$

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

$C = \frac{0.200\ mol}{2.0\ L}$

$\boxed{C = 0.10\ mol/L}$

(9) $V = 250\ mL$

$n = 0.70\ mol$ $NaCl$

$C = ?$

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

$C = \frac{0.70\ mol}{0.250\ L}$

$\boxed{C = 2.8\ mol/L}$

(11) $n = ?$

$V = 250\ mL$

$C = 2.0\ M$ $CaCl_2$

$m = ?$

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

$2.0\ mol/L = \frac{n}{0.250\ L}$

$n = (2.0\ mol/L)(0.250\ L)$

$\boxed{n = 0.50\ mol}$

$0.50\ mol\ CaCl_2 \times \frac{110.98\ g\ CaCl_2}{1\ mol\ CaCl_2} = \boxed{55\ g\ CaCl_2}$

Concentration Ratios

Percent by Volume

$$\%(v/v) = \frac{\text{volume of solute}}{\text{volume of solution}} \times 100\%$$

Ex. 5% acetic acid

$$\Rightarrow \quad \frac{5 \text{ mL of acid}}{100\text{mL of solution}}$$

Mass - Mass Ratio (% (m/m))

$$\%(m/m) = \frac{\text{mass of solute}}{\text{mass of solution}} \times 100\%$$

Ex. 6% m/m of hydrogen peroxide

$$\Rightarrow \quad \frac{6 \text{ g of } H_2O_2}{100 \text{ g of solution}}$$

Sample Problems

What is the percent by volume of ethanol in the final solution when 85mL of ethanol is diluted to a total volume of 250 mL with water?

$V_{solute} = 85mL$

$V_{sol'n} = 250mL$

$$\%\ v/v = \frac{\text{volume solute}}{\text{volume solution}} \times 100\%$$

$$\%v/v = \frac{85mL}{250mL} \times 100\%$$

$$\%v/v = 34\%$$

What mass of KNO_3 would be needed to prepare 1250 g of a 15.0% (m/m) KNO_3 solution?

$\%_{o}m/m = 15\%$

$m_{sol'n} = 1250g$

$m_{solute} = ?$

$$\%\ m/m = \frac{m_{solute}}{m_{sol'n}} \times 100\%$$

$$15\% = \frac{m_{solute}}{1250g} \times 100\%$$

$$0.15 = \frac{m_{solute}}{1250g}$$

$$m_{solute} = 0.15(1250g)$$

$$m_{solute} = 188g$$

Homework

p. 485 #14, 15
p. 486 #16-23