Check #8-11

8. $m = 36.0\,g$

$V = 2.0\,L$

$C_6H_{12}O_6$

$Mm = 180\,g/mol$

$C = ?$

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

$= 0.200\,mol\ C_6H_{12}O_6$

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

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

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

11) $V = 250\,mL$

$C = 2.0\,M$

$= 2.0\,mol/L$

$CaCl_2$

$n = ?$

$m = ?$

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

$n = C \times V$

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

$\boxed{n = 0.50\,mol}$

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

Concentration Ratios

Percent by Volume

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

5 mL POP
100mL H_2O

Ex. 5% acetic acid

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

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

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

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?

$\%(v/v) = ?$

$V_{solute} = 85mL$

$V_{solution} = 250mL$

$$\%(v/v) = \frac{V_{solute}}{V_{solution}} \times 100\%$$

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

$$\%(v/v) = 34\%$$

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

$m_{solute} = ?$

$m_{solution} = 1250g$

$\%\ m/m = 15.0\%$

$$\%(m/m) = \frac{m_{solute}}{m_{solution}} \times 100\%$$

$$15.0\% = \frac{m_{solute}}{1250g} \times 100\%$$

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

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

$$m_{solute} = 188g$$

Homework

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