p. 482

(10) $M = \frac{mol}{L\ soln}$

$0.425M = \frac{mol}{0.335L}$

$\boxed{mol = 0.142 \text{ or } 1.42 \times 10^{-1}}$

(11) $M = \frac{mol}{L\ soln}$

$2.0M = \frac{mol}{0.250L}$

$\boxed{mol = 0.50 \text{ or } 5.0 \times 10^{-1}}$

$0.5 \text{ mol } CaCl_2 \left(\frac{111.0 \text{ g } CaCl_2}{1 \text{ mol } CaCl_2}\right) = \boxed{56 \text{ g } CaCl_2}$

(12) $M_1V_1 = M_2V_2$

$(4.00M)(V_1) = (0.760M)(250.0 \text{ mL})$

$V_1 = \frac{(0.760M)(250.0 \text{ mL})}{(4.00M)}$

$= \boxed{47.5 \text{ mL}}$

(13) $M_1V_1 = M_2V_2$

$(1.0\,M)(V_1) = (0.20\,M)(250\,mL)$

$$V_1 = \frac{(0.20\,M)(250\,mL)}{(1.0\,M)}$$

$\boxed{= 50\,mL}$

ADD 50 mL of 1.0 M NaCl to a flask, then add distilled water until you reach the 250 mL line

PERCENT Solutions

(1) RATIO of the volume of the solute to the volume of the solution

⇓

PERCENT by volume (% (v/v))

$$\boxed{= \frac{\text{volume of solute}}{\text{volume of soln}} \times 100\%}$$

(2) RATIO of the MASS of the solute to the MASS of the solution

PERCENT by MASS ($\%(m/m)$)

$$= \boxed{\frac{\text{MASS of solute}}{\text{MASS of solution}} \times 100\%}$$

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p 485

(14) $\%(v/v) = \frac{10\ mL\ C_3H_6O}{200\ mL} = \boxed{5\%\ v/v}$

(15) $\%(v/v) = \frac{\text{volume solute}}{\text{volume of soln}}$

$3\% = \frac{\text{volume solute}}{400\ mL}$

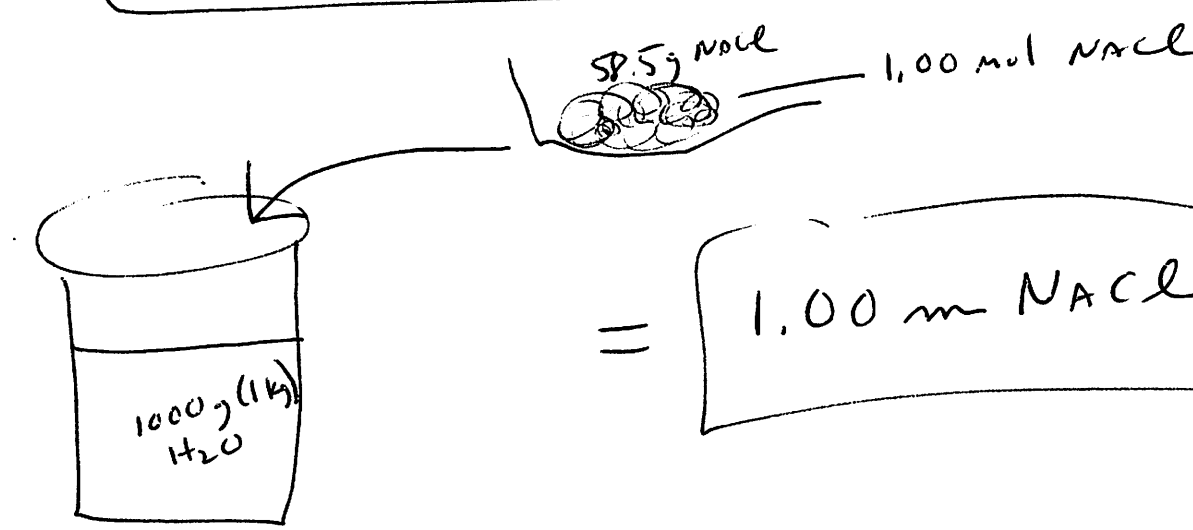
$400\ mL\ (0.03) = \text{volume solute}$

$\boxed{12\ mL = \text{volume solute}}$

Molality

→ Molality (m) is the # moles of solute dissolved in 1 kg (1000 g) of solvent

$$\boxed{\text{Molality} = \frac{\text{moles solute}}{\text{kg solvent}}}$$



$$= \boxed{1.00\ m\ NaCl}$$

PRACTICE

How many grams of sodium fluoride are needed to prepare a 0.400 m NaF soln that contains 750 g of water?

$$m = \frac{\text{mol sol}}{\text{kg solvent}} \quad \text{so} \quad 0.400\,m = \frac{\text{mol sol}}{0.750\ \text{kg}}$$

$$\boxed{\text{mol sol} = 0.3}$$

$$0.3\ \text{mol NaF}\left(\frac{42.0\ \text{g NaF}}{1\ \text{mol NaF}}\right) = \boxed{12.6\ \text{g NaF}}$$

Freezing Point Depression

ΔT_f = difference in TEMP between the freezing point of the pure solvent and the freezing point of the solution

Boiling Point Elevation

ΔT_b = the difference in TEMP between the boiling point of the pure solvent and the boiling point of the solution

K_f = molal freezing point depression constant

→ different for each solvent

→ H_2O is 1.86 °C/m

K_b = molal boiling point elevation constant

→ different for each solvent

→ H_2O is 0.512 °C/m

i → # particles the solute dissociates into; van't Hoff factor

→ unitless

$$\boxed{\Delta T_b = i \cdot K_b \cdot m}$$

and

$$\boxed{\Delta T_f = i \cdot K_f \cdot m}$$