Check Homework - p. 477 #3-6

Concentration of a Solution

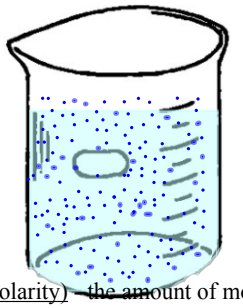
concentration - a numerical ratio comparing the quantity of solute to the quantity of solution.

⇒units: **g/L or g/mL** (solutes that are solids in pure form)

dilute - a solution that has a small amount of solute as compared to the amount of solvent

dilution - process of adding more solvent to cause a solution to become more dilute

concentrated - a solution that has a large amount of solute as compared to the amount of solvent



molar concentration (molarity) - the amount of moles of solute dissolved in one litre of solvent

⇒units: mol/L

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

C: concentration (mol/L); n: # of moles (mol); V: volume (L)

Ex. An intravenous solution contains 0.90 g NaCl in 100.mL of solution. What is the molarity of this solution?

$m = 0.90\text{g}$ NaCl

$V = 100.\text{mL}$

$C = ?$

$0.90\text{g NaCl} \times \frac{1\ \text{mol NaCl}}{58.44\text{g NaCl}} = 0.0154\ \text{mol}$

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

$C = \frac{0.0154\text{mol}}{0.100\text{ L}}$

$C = 0.15\ \text{mol/L}$

Ex. What volume of solution is required to dissolve 1.75 mol to make a 0.95 mol/L solution of $CaCO_3$?

$n = 1.75\ mol$

$C = 0.95\ mol/L$

$V = ?$

$CaCO_3$

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

$$0.95\ mol/L = \frac{1.75\ mol}{V}$$

$$\frac{(0.95\ mol/L)V}{0.95\ mol/L} = \frac{1.75\ mol}{0.95\ mol/L}$$

$$V = 1.8\ L$$

Ex. A sample of laboratory ammonia solution has a concentration of 14.8 mol/L. What mass of ammonia is present in a 25.0 mL sample of this solution? (NH_3)

$C = 14.8\ mol/L$

$V = 25.0\ mL$

$m = ?$

NH_3

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

$$n = C \times V$$

$$n = (14.8\ mol/L)(0.0250\ L)$$

$$n = 0.370\ mol$$

$$0.370\ mol\ NH_3 \times \frac{17.04\ g\ NH_3}{1\ mol\ NH_3} = 6.30\ g\ NH_3$$

Practice Problems

p. 481 #8,9

p. 483 #10,11