Check Homework - #1-7

6 a) solid / liquid　　　b) gas / liquid

10g / L　@20°C

① increase temp.　　　　① decrease temp.

② add water　　　　　② add more water

$$\frac{S_1}{P_1} = \frac{S_2}{P_2}$$

Concentration of a Solution

concentration - a numerical ratio comparing the quantity of solute to the quantity of solution.
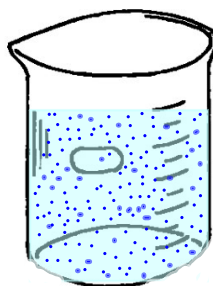
⇒ units: **g/L or g/mL** (solutes that are solids in pure form)

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 one litre of solvent

⇒ units: mol/L

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

Concentration (mol/L), # moles (mol), ← volume (L)

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

$m = 0.90g$ NaCl

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

$V = 100. mL$
$= 0.100 L$

$C = ?$

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

$$NaCl \rightarrow (1 \times 22.99) + (1 \times 35.45) = 58.44\, g/mol$$

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

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

$$\boxed{C = 0.15\, mol/L}$$

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

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

$V = ?$

$n = 1.75\,mol$

$C = 0.95\,mol/L$

$$\frac{0.95\,mol/L}{1} = \frac{1.75\,mol}{V}$$

$$(0.95\,mol/L)\,V = 1.75\,mol$$

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

$$\boxed{V = 1.8\,L}$$

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?

$C = 14.8\,mol/L$
NH_3

$m = ?$

$V = 25.0\,mL$

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

$$n = C \times V$$

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

$$n = 0.370\,mol$$

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

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Practice Problems

p. 481 #8,9

p. 483 #10,11