Sturman
BHS

Name Sturman key
Period ____ Date ____

Practice SOLUTIONS QUIZ (w/ Ans Ranges)

Show work for credit. Round to the correct # of sig figs and include units.
Remember BrINClHOF!

(.013-.018M) 1. Some sweeteners contain saccharin ($C_7H_5NO_3S$). Determine the molarity of a 250.0mL iced tea solution containing 0.75g of saccharin.

$\frac{0.75g\ C_7H_5NO_3S}{1} \cdot \frac{1mol}{183.20g} = 0.0041mol$

$M = \frac{.0041mol}{.2500L} = \boxed{.016M}$

(370-390g I_2) 2. How much iodine, in grams, should be added to water to produce 2.50L of a 0.60M solution?

$0.60 = \frac{X\ mol\ I_2}{2.50L}$

$X = 1.5mol\ I_2$

$\frac{1.5mol\ I_2}{1} \cdot \frac{253.8g\ I_2}{1\ mol\ I_2} = 380.7g$ 2SF

$= \boxed{380g\ I_2}$

(1.5-1.7m) 3. Determine the molality of a solution containing 230.0 g of bromine in 875g of carbon tetrachloride (CCl_4)?

$\frac{230.0g\ Br_2}{1} \cdot \frac{1mol\ Br_2}{159.80g\ Br_2} = 1.439mol\ Br_2$

$m = \frac{1.439mol\ Br_2}{0.875kg\ CCl_4}$

$= \boxed{1.64m}$

(.4-.5) 4. A gas mixture contains 123g of sulfur dioxide, 175g of nitrogen, and 230.0g of carbon dioxide. What is the mole fraction of nitrogen?

$\frac{123g\ SO_2}{1} \cdot \frac{1mol\ SO_2}{64.07g\ SO_2} = 1.92mol\ SO_2$

$\frac{175g\ N_2}{1} \cdot \frac{1mol\ N_2}{28.02g\ N_2} = 6.25mol\ N_2$

$\frac{230.0g\ CO_2}{1} \cdot \frac{1mol\ CO_2}{44.01g\ CO_2} = 5.23mol\ CO_2$

$X_{N_2} = \frac{6.25mol\ N_2}{13.4mol\ soln}$

$= 0.466$

or $\boxed{46.6\%\ N_2}$

5. The solubility of CO_2 in soda is $\frac{570g\ CO_2}{1L\ H_2O}$ at 25°C, 3.74atm. What is the solubility in Bozeman? (Atm 0.857 atm. Temp 25°C) Use Henry's law. (125-135g)

$\frac{S_1}{P_1} = \frac{S_2}{P_2}$ $\quad \frac{570}{3.74atm} = \frac{X}{.857atm}$

$X = \boxed{\frac{131g\ CO_2}{1kg\ H_2O}}$

6. If the solubility increases to 120.0g/100g H_2O at 70.0°C, how much KNO_3 could be dissolved in 45.9mL of H_2O? Assume it's a solid. 50-60g KNO_3

$\frac{120.0g\ KNO_3}{100.0g\ H_2O} = \frac{X\ g\ KNO_3}{45.9g\ H_2O} \Rightarrow \boxed{55.1g\ KNO_3}$

7. You are in charge of making 750.0mL of 3.00M hydrochloric acid from 12.0M stock solution, how much 12.0M HCl would you need? How much water would you add?
(180-190ml of 12.0 M HCl + 555-565ml H_2O)

$M_1V_1 = M_2V_2$

$3.00M(750.0mL) = (12.0M)V_2$ $\quad V_2 = \boxed{187.5ml}$ of 12M HCl

$\therefore \boxed{562.5ml\ H_2O}$

8. How many grams of ammonium chloride, NH_4Cl, would you need to prepare 8.50L of a 6.25% (m/m) solution? 525-535g NH_4Cl

$0.0.625 = \frac{X}{8500g} \Rightarrow X = 531.25$

$= \boxed{531g\ NH_4Cl}$

9. You have 5.00 moles of sucrose, $C_{12}H_{22}O_{11}$, in a 1.0L beaker of water and 5.00 moles of calcium hydroxide, Ca $(OH)_2$, in another 1.0L beaker of water. Which sample has the highest

a. boiling point? $Ca(OH)_2$

b. vapor pressure? $C_{12}H_{22}O_{11}$

c. freezing point? $C_{12}H_{22}O_{11}$