Name: KEY Hour: Date:

Solutions Quiz

/20

1. Given a 4.00 M stock of sodium chloride, NaCl, how would you prepare 100 mL of 1.00 M NaCl?

$\frac{100\text{ mL}}{1} \times \frac{1\text{ L}}{1000\text{ mL}} \times \frac{1.00\text{ mol NaCl}}{1\text{ L}} \times \frac{1\text{ L}}{4.00\text{ mol}} \times \frac{1000\text{ mL}}{1\text{ L}} = 25\text{mL of 4.00M}$

$M_1V_1 = M_2V_2 \quad \frac{(4.0\text{M})(V_1)}{4.0\text{M}} = \frac{(1.0\text{M})(100\text{mL})}{4.0\text{M}} \quad V_1 = 25\text{mL}$

2. You dilute 500 mL of a 0.40 M stock of magnesium acetate, $Mg(C_2H_3O_2)_2$ to 4.0 L. What is the concentration of the diluted solution?

-2

$M_1V_1 = M_2V_2$

$\frac{(500\text{mL})(.40\text{M})}{\frac{4.0\text{L}}{4000\text{mL}}} = \frac{M_2(4.0\text{L})}{\frac{4.0\text{L}}{4000\text{mL}}}$

$M_2 = 50\text{M}$

$M_2 = 0.05\text{M}$

3. How much of a 2.0 M solution do you need to get 8.0 moles of hydrochloric acid, HCl?

$\frac{8.0\text{ mol HCl}}{1} \times \frac{1\text{L}}{2\text{ mol}} = 4\text{L}$

4. How many moles of solute are contained in 343 grams of a 23% aqueous solution of $MgCr_2O_7$?

$343_g \times .23 = 78.89_g\ MgCr_2O_7$

$\frac{78.89_g\ MgCr_2O_7}{1} \times \frac{1\text{ mol } MgCr_2O_7}{240.2928_g\ MgCr_2O_7} = 0.328\text{ mol } MgCr_2O_7$

5. How many ml of 6.0 M HBr will provide 46 g of HBr?

$\frac{46_g\ HBr}{1} \times \frac{1\text{ mol HBr}}{80.912_g\ HBr} \times \frac{1\text{ L HBr}}{6.0\text{ mol HBr}} \times \frac{1000\text{mL}}{1\text{L}} = 94.75\text{mL}$

6. A one liter flask of 1.37M citric Acid, $H_3C_6H_5O_7$, holds 1100 grams of solution. What is the molality of this solution? Assume you have 1 liter of solution.

$\frac{1.37\text{ mol}}{\text{L}}$ 1,100 g Soln. = Solvent + solute

1L of soln $= \frac{1.37\text{mol } H_3C_6H_5O_7}{1} \times \frac{192.13_g\ H_3C_6H_5O_7}{1\text{mol } H_3C_6H_5O_7} = 263.2_g$ solute

1100 g − 263.2 g solute = 836.8 g solvent

$\frac{1.37\text{mol}}{.8368\text{kg}} = 1.64\text{m } H_3C_6H_5O_7$