

Name Key Name \_\_\_\_\_  
 (print name) (sign name)

Please show all work for full credit and to get partial credit.  $R = 0.08206 \text{ L atm/mol K}$   $N_A = 6.022 \times 10^{23}$

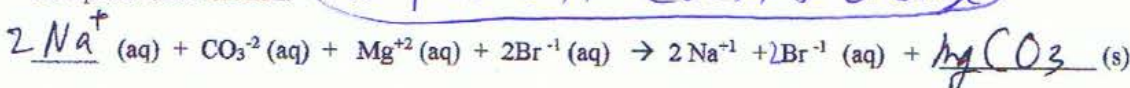
1. If you take 13.8 grams of NaCl and add water to make up a 0.500 L solution, what is the molarity (M = # mole/liter) of the solution. (Show work) (FW NaCl = 58.44 g NaCl/mol NaCl) (3.5 pts) attempt - 1/2

$M = \frac{13.8 \text{ g NaCl}}{58.44 \text{ g/mol}} \div 0.500 \text{ L} = 0.472 \text{ M}$  math 1/2 pt

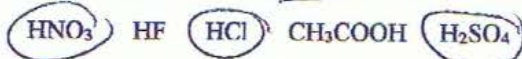
2. For the following precipitation reaction written as the molecular equation, fill in the blanks to write the complete ionic equation (4 pts, 2 pts each) 2 pt 1 pt



Complete ionic reaction: no pts off Coeff + Charge



3. Circle all of the following which are strong acids. You may circle one, all or none of the choices. (2.5 pts, 1/2 pt each)

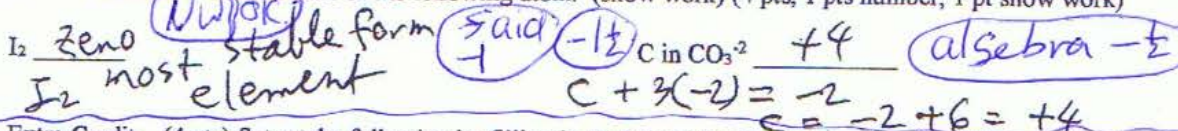


4. Stoichiometry: In the following reaction if I have 1.25 moles of the Fe, what is the theoretical yield of the Fe<sub>2</sub>O<sub>3</sub> (FW Fe<sub>2</sub>O<sub>3</sub> = 159.70 g Fe<sub>2</sub>O<sub>3</sub>/mol Fe<sub>2</sub>O<sub>3</sub>) (show work) (5 pts) attempt - 2

$4\text{Fe}(\text{s}) + 3\text{O}_2(\text{g}) \rightarrow 2\text{Fe}_2\text{O}_3(\text{s})$

$1.25 \text{ mol Fe} \times \frac{2 \text{ mol Fe}_2\text{O}_3}{4 \text{ mol Fe}} \times \frac{159.70 \text{ g Fe}_2\text{O}_3}{1 \text{ mol Fe}_2\text{O}_3} = 99.8 \text{ g Fe}_2\text{O}_3$

5. Give the oxidation state of the following atom. (show work) (4 pts, 1 pts number, 1 pt show work)



Extra Credit: (4 pts) Set up the following by filling in the blanks (you may use a ? or the letter symbol (P, V, n or T) for an unknown variable. Plug into the equation to complete this question. You do not need to come up with the final correct answer but units need to be correct. (Kelvin = °C + 273.15, 1 atm = 760 torr = 760 mm Hg) Use the Combined Gas Law to answer the following.  $(P_2 V_2) / (P_1 V_1) = T_2 / T_1$

If a gas occupies 3.5 Liters at 1.2 atm & 25.0°C, what is the pressure of the gas at 1.5 Liters at 78.1 °C ?

$P_1 = 1.2 \text{ atm}$   $V_1 = 3.5 \text{ L}$   $T_1 = 298.15$   $P_2 = ?$   $V_2 = 1.5 \text{ L}$   $T_2 = 351.25$

2 pts writing out the equation with all variables plugged into the equation. (on back if you run out of space)

$\frac{(P_2)(1.5 \text{ L})}{(1.2 \text{ atm})(3.5 \text{ L})} = \frac{298.15}{351.25}$

$P_2 = \frac{(1.2)(3.5)(298.15)}{(1.5)(351.25)} = 3.3 \text{ atm}$  1/4 no T convert

attempt - 1

Name Key (print name) Name \_\_\_\_\_ (sign name)

Please show all work for full credit and to get partial credit.  $R = 0.08206 \text{ L atm/mol K}$   $N_A = 6.022 \times 10^{23}$

1. If you take 72.5 grams of NaCl and add water to make up a 0.0125 L solution, what is the molarity ( $M = \# \text{ mole/liter}$ ) of the solution. (Show work.) (FW NaCl = 58.44 g NaCl/mol NaCl) (3.5 pts)

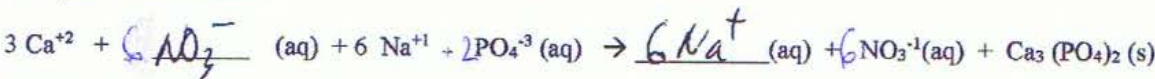
$$\left( \frac{72.5 \text{ g NaCl}}{0.0125 \text{ L NaCl soln}} \right) \times \left( \frac{\text{mol NaCl}}{58.44 \text{ g NaCl}} \right) = 99.2 \text{ mol}$$

*(1 pt) (1 pt) (1 pt) attempt - 1/2*

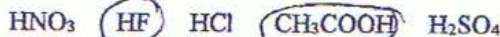
2. For the following precipitation reaction written as the molecular equation, fill in the blanks to write the complete ionic equation (4 pts, 2 pts each)



Complete ionic reaction:

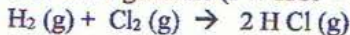


3. Circle all of the following which are weak acid. You may circle one, all or none of the choices. (2.5 pts, 1/2 pt each)



*bad attempt - 3*

4. Stoichiometry: In the following reaction if I start with 7.33 moles of the  $\text{H}_2$ , how many grams of the HCl will I generate (FW HCl = 36.46 g HCl / mol HCl) (show work) (5 pts)

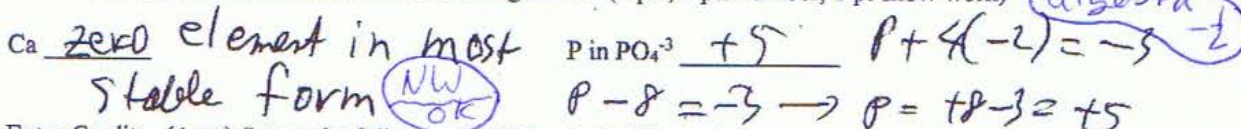


$$7.33 \text{ moles } \text{H}_2 \times \frac{2 \text{ mol HCl}}{1 \text{ mol } \text{H}_2} \times \frac{36.46 \text{ g HCl}}{1 \text{ mol HCl}} = 534.5 \text{ g HCl}$$

*(2 pt) (1 pt) (1 pt) attempt - 2*

$535 \text{ g HCl}$  *(1 pt) sig fig*

5. Give the oxidation state of the following atom. (4 pts, 1 pts number, 1 pt show work)



Extra Credit: (4 pts) Set up the following by filling in the blanks (you may use a ? or the word **unknown** or the letter symbol (P, V, n or T) for an unknown variable. Plug into the equation to complete this question with **correct units**. Use the Ideal Gas Law to answer the following. [ $PV = nRT$ ,  $R = 0.08206 \text{ (Liter Atm) / (Mol K)}$ ] (Kelvin =  $^\circ\text{C} + 273.15$ , 1 atm = 760 torr = 760 mm Hg)

For 1.2 moles of a gas at 300 Kelvin at 770 torr, how much volume does the gas occupy?

$P = 770 \text{ torr}$   $V = ?$   $n = 1.2 \text{ mol}$   $T = 300 \text{ K}$  (2 pts, 1/2 pt each)

2 pts writing out the equation with all variables plugged in. (complete on back if run out of space)

$$V = \frac{(1.2 \text{ mol})(0.08206 \frac{\text{L atm}}{\text{mol K}})(300 \text{ K})}{770 \text{ torr} / 760 \text{ torr} = 1.01 \text{ atm}}$$

$$V = \frac{(1.2)(0.08206)(300)}{1.01} = 29 \text{ L}$$

*Convert - 1/2*

Quiz IV General Chemistry I Lecture Fall 14 Dr. Hahn 20 pts 10/10 F 10:30am form A quiz # \_\_\_\_\_

Name Key Name \_\_\_\_\_  
 (print name) (sign name)

Please show all work for full credit and to get partial credit.  $R = 0.08206 \text{ L atm / mol K}$   $N_A = 6.022 \times 10^{23}$

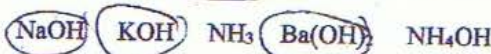
1. If I dilute a 200 mL 0.25 M solution of  $\text{HNO}_3$  by adding enough water to make up a 350 mL solution, what is the concentration of the  $\text{HNO}_3$ ? ( $M_1V_1 = M_2V_2$ ) (show work) (3.5 pts)

$(200 \text{ mL})(0.25 \text{ M}) = M_2(350 \text{ mL})$  -1.5 pt attempt  
 $M_2 = \frac{(200 \text{ mL})(0.25 \text{ M})}{350 \text{ mL}} = 0.14 \text{ M}$  math 1/2 pt

2. For the following precipitation reaction written as the molecular equation, fill in the blanks to write the net ionic equation (4 pts, 2 pts each)



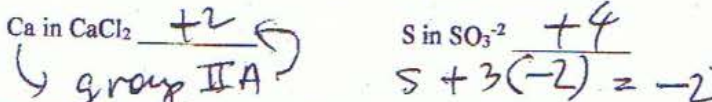
3. Circle all of the following which are strong bases. You may circle one, all or none of the choices. (2.5 pts, 1/2 pt each)



4. Stoichiometry: In the following reaction, how many moles of  $\text{H}_2\text{O}$  will I generate if I start with 73.2 grams of the  $\text{CH}_3\text{OH}$ ? (FW  $\text{CH}_3\text{OH} = 32.05 \text{ g CH}_3\text{OH / mol CH}_3\text{OH}$ ) (show work) (5 pts)

$2 \text{CH}_3\text{OH}(\text{l}) + 3 \text{O}_2(\text{g}) \rightarrow 2 \text{CO}_2(\text{g}) + 4 \text{H}_2\text{O}(\text{g})$   
 $73.2 \text{ g CH}_3\text{OH} \times \frac{1 \text{ mol CH}_3\text{OH}}{32.05 \text{ g CH}_3\text{OH}} \times \frac{4 \text{ mol H}_2\text{O}}{2 \text{ mol CH}_3\text{OH}} = 4.57 \text{ mol H}_2\text{O}$  math 1 pt

5. Give the oxidation state of the following atom. Either show work or explain where you got the oxidation state. (4 pts, 1 pts number, 1 pt show work)



$S = -2 + 6 = +4$  math 1/2

Extra Credit: (4 pts) Set up the following by filling in the blanks (you may use a ? or the letter symbol (P, V, n or T) for an unknown variable. Plug into the equation to complete this question. You do not need to come up with the final correct answer but units need to be correct. (Kelvin =  $^\circ\text{C} + 273.15$ , 1 atm = 760 torr = 760 mm Hg) Use the Combined Gas Law to answer the following.  $(P_2 V_2) / (P_1 V_1) = T_2 / T_1$

If a gas measures  $35.0^\circ\text{C}$  at 1.1 atm, for a 1.5 Liter samples, what volume does the gas occupy at  $17.3^\circ\text{C}$  and 1.1 atm?

$P_1 = 1.1 \text{ atm}$   $V_1 = 1.5 \text{ L}$   $T_1 = 308.15$   $P_2 = 1.1 \text{ atm}$   $V_2 = ?$   $T_2 = 290.45$   
 pts, 1/3 pt each 290.45 +273.15

2 pts writing out the equation with all variables plugged into the equation. (on back if you run out of space)

$\frac{(1.1 \text{ atm}) V_2}{(1.1 \text{ atm})(1.5 \text{ L})} = \frac{290.45}{308.15} \rightarrow V_2 = \frac{290.45(1.5 \text{ L})}{308.15} = 1.4 \text{ L}$   
 not T convert -1 each

Name Key Name \_\_\_\_\_  
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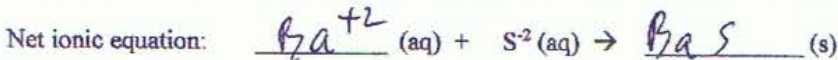
Please show all work for full credit and to get partial credit.  $R = 0.08206 \text{ L atm/mol K}$   $N_A = 6.022 \times 10^{23}$

1. If I dilute a 50.0 mL 0.125 M solution of  $\text{NaNO}_3$  by adding enough water to make up a 250 mL solution, what is the concentration of the  $\text{NaNO}_3$ ? ( $M_1V_1 = M_2V_2$ ) (show work) (3.5 pts)

$M_1 = 0.125 \text{ M}$   $V_1 = 50.0 \text{ mL}$   $V_2 = 250 \text{ mL}$   $M_2 = \frac{(0.125)(50.0)}{(250 \text{ mL})}$

$(0.125 \text{ M})(50.0 \text{ mL}) = M_2(250 \text{ mL})$

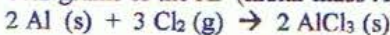
2. For the following precipitation reaction written as the molecular equation, fill in the blanks to write the net ionic equation (4 pts, 2 pts each)



3. Circle all of the following which are weak bases. You may circle one, all or none of the choices. (2.5 pts, 1/2 pt each)

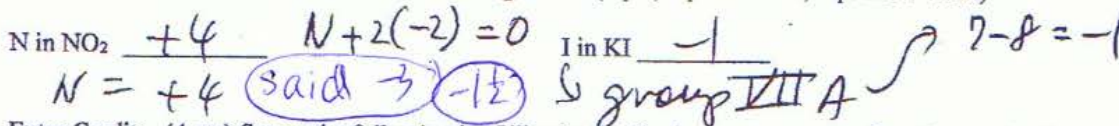


4. Stoichiometry: In the following reaction, how many moles of  $\text{AlCl}_3$  will I generate if I start with 80.2 grams of the Al (molar mass Al = 26.98 g/mol) (show work) (5 pts)



$80.2 \text{ g Al} \times \frac{1 \text{ mol Al}}{26.98 \text{ g Al}} \times \frac{2 \text{ mol AlCl}_3}{2 \text{ mol Al}} = 2.97 \text{ mol AlCl}_3$

5. Give the oxidation state of the following atom. (4 pts, 1 pts number, 1 pt show work)



Extra Credit: (4 pts) Set up the following by filling in the blanks (you may use a ? or the word **unknown** or the letter symbol **P, V, n** or **T**) for an unknown variable. Plug into the equation to complete this question with correct units. Use the Ideal Gas Law to answer the following. [ $PV = nRT$ ,  $R = 0.08206$  (Liter Atm) / (Mol K)] (Kelvin =  $^\circ\text{C} + 273.15$ , 1 atm = 760 torr = 760 mm Hg)

For a gas at  $29.2^\circ\text{C}$  and 1.2 atm contained in a 2.5 Liter container, how many moles of gas do you have?

$P = 1.2 \text{ atm}$   $V = 2.5 \text{ L}$   $n = ?$   $T = 29.2 + 273.15 = 302.35$  (2 pts, 1/2 pt each)

2 pts writing out the equation with all variables plugged in. (complete on back if run out of space)

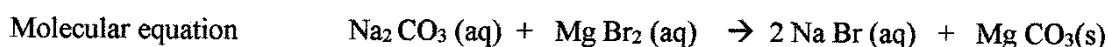
$(1.2 \text{ atm})(2.5 \text{ L}) = (n)(0.08206 \frac{\text{L atm}}{\text{mol K}})(302.35)$   
 $n = \frac{(1.2)(2.5)}{(0.08206)(302.35)} = 0.12 \text{ moles}$

Name \_\_\_\_\_ Name \_\_\_\_\_  
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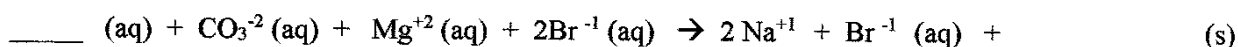
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1. If you take 13.8 grams of Na Cl and add water to make up a 0.500 L solution, what is the molarity (M = # mole/liter) of the solution. (Show work.) (FW Na Cl = 58.44 g NaCl/mol NaCl ) (3.5 pts)

2. For the following precipitation reaction written as the molecular equation, fill in the blanks to write the complete ionic equation (4 pts, 2 pts each)



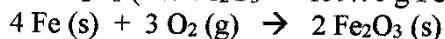
Complete ionic reaction:



3. Circle all of the following which are strong acids. You may circle one, all or none of the choices. (2.5 pts, 1/2 pt each)



4. Stoichiometry: In the following reaction if I have 1.25 moles of the Fe, what is the theoretical yield of the  $\text{Fe}_2\text{O}_3$  (FW  $\text{Fe}_2\text{O}_3 = 159.70 \text{ g Fe}_2\text{O}_3 / \text{mol Fe}_2\text{O}_3$  )(show work) (5 pts)



5. Give the oxidation state of the following atom. (show work) (4 pts, 1 pts number, 1 pt show work)

$\text{I}_2$  \_\_\_\_\_

C in  $\text{CO}_3^{-2}$  \_\_\_\_\_

Extra Credit: (4 pts) Set up the following by filling in the blanks (you may use a ? or the letter symbol (P,V, n or T) for an unknown variable. Plug into the equation to complete this question. You do not need to come up with the final correct answer but units need to be correct. (Kelvin =  $^{\circ}\text{C} + 273.15$ , 1 atm = 760 torr = 760 mm Hg) Use the Combined Gas Law to answer the following.  $(P_2 V_2) / (P_1 V_1) = T_2 / T_1$

If a gas occupies 3.5 Liters at 1.2 atm & 25.0 $^{\circ}\text{C}$ , what is the pressure of the gas at 1.5 Liters at 78.1  $^{\circ}\text{C}$  ?

$P_1 =$  \_\_\_\_\_  $V_1 =$  \_\_\_\_\_  $T_1 =$  \_\_\_\_\_  $P_2 =$  \_\_\_\_\_  $V_2 =$  \_\_\_\_\_  $T_2 =$  \_\_\_\_\_  
 (2 pts, 1/3 pt each)

2 pts writing out the equation with all variables plugged into the equation. (on back if you run out of space)

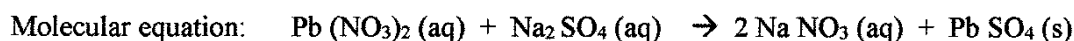


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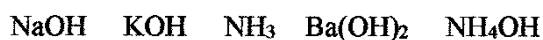
Please show all work for full credit and to get partial credit.  $R = 0.08206 \text{ L atm/ mol K}$   $N_A = 6.022 \times 10^{23}$

1. If I dilute a 200 mL 0.25 M solution of  $\text{HNO}_3$  by adding enough water to make up a 350 mL solution, what is the concentration of the  $\text{HNO}_3$ ? ( $M_1V_1 = M_2V_2$ ) (show work) (3.5 pts)

2. For the following precipitation reaction written as the molecular equation, fill in the blanks to write the net ionic equation (4 pts, 2 pts each)



3. Circle all of the following which are strong bases. You may circle one, all or none of the choices. (2.5 pts, 1/2 pt each)



4. Stoichiometry: In the following reaction, how many moles of  $\text{H}_2\text{O}$  will I generate if I start with 73.2 grams of the  $\text{CH}_3\text{OH}$ ? (FW  $\text{CH}_3\text{OH} = 32.05 \text{ g CH}_3\text{OH} / \text{mol CH}_3\text{OH}$ ) (show work) (5 pts)

$$2 \text{CH}_3\text{OH}(\text{l}) + 3 \text{O}_2(\text{g}) \rightarrow 2 \text{CO}_2(\text{g}) + 4 \text{H}_2\text{O}(\text{g})$$

5. Give the oxidation state of the following atom. Either show work or explain where you got the oxidation state. (4 pts, 1 pts number, 1 pt show work)



Extra Credit: (4 pts) Set up the following by filling in the blanks (you may use a ? or the letter symbol **(P, V, n or T)** for an unknown variable. Plug into the equation to complete this question. You do not need to come up with the final correct answer but **units need to be correct**. (Kelvin =  $^\circ\text{C} + 273.15$ , 1 atm = 760 torr = 760 mm Hg) Use the Combined Gas Law to answer the following.  $(P_2 V_2) / (P_1 V_1) = T_2 / T_1$

If a gas measures  $35.0^\circ\text{C}$  at 1.1 atm, for a 1.5 Liter samples, what volume does the gas occupy at  $17.3^\circ\text{C}$  and 1.1 atm ?

$P_1 = \text{_____}$   $V_1 = \text{_____}$   $T_1 = \text{_____}$   $P_2 = \text{_____}$   $V_2 = \text{_____}$   $T_2 = \text{_____}$  (2 pts, 1/3 pt each)

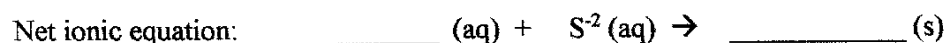
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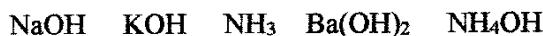
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1. If I dilute a 50.0 mL 0.125 M solution of  $\text{Na NO}_3$  by adding enough water to make up a 250 mL solution, what is the concentration of the  $\text{Na NO}_3$ ? ( $M_1 V_1 = M_2 V_2$ ) (show work) (3.5 pts)

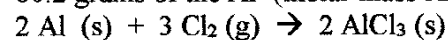
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3. Circle all of the following which are weak bases. You may circle one, all or none of the choices. (2.5 pts, ½ pt each)



4. Stoichiometry: In the following reaction, how many moles of  $\text{AlCl}_3$  will I generate if I start with 80.2 grams of the Al (molar mass Al = 26.98 g/mol) (show work) (5 pts)



5. Give the oxidation state of the following atom. (4 pts, 1 pts number, 1 pt show work)

N in  $\text{NO}_2$  \_\_\_\_\_

I in  $\text{KI}$  \_\_\_\_\_

Extra Credit: (4 pts) Set up the following by filling in the blanks (you may use a ? or the word **unknown** or **the letter symbol (P, V, n or T)** for an unknown variable. Plug into the equation to complete this question with **correct units**. Use the Ideal Gas Law to answer the following.  $[ P V = n R T, R = 0.08206 \text{ (Liter Atm) / (Mol K)}$  ] (Kelvin =  $^{\circ}\text{C} + 273.15$ , 1 atm = 760 torr = 760 mm Hg)

For a gas at 29.2  $^{\circ}\text{C}$  and 1.2 atm contained in a 2.5 Liter container, how many moles of gas do you have ?

P = \_\_\_\_\_ V = \_\_\_\_\_ n = \_\_\_\_\_ T = \_\_\_\_\_ (2 pts, ½ pt each)

2 pts writing out the equation with all variables plugged in. (complete on back if run out of space)