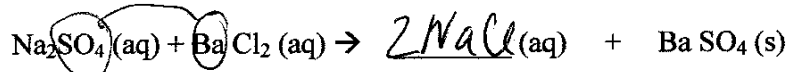


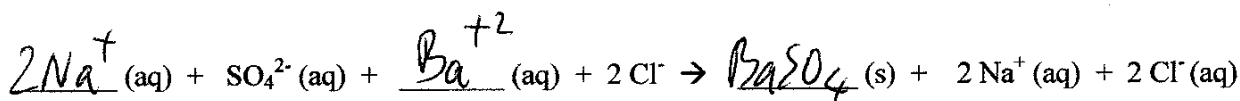
Name Key (print name) Name _____ (sign name)

Please show all work for full credit & for partial credit for all questions.

1. Complete the following precipitation reaction by filling in each blank with an ion or molecule. (5 pts)
molecular equation



ionic equation



2. Circle the following which are strong acids. (5 pts)



3. Assign oxidation state of the S in SO₄²⁻ (oxygen has ox state = -2)(show work). (4 pts)

$$\begin{aligned} S + 4(-2) &= -2 \\ S &= -2 + 8 \\ S &= +6 \end{aligned}$$

4. If you have 2.2 moles of a gas in 501.2 mL volume at 278.2 K, what is the pressure in atmospheres. [PV = nRT, R=0.08206 (L atm)/(mol K)] (I made up these numbers so the numbers have no relation to reality.) (6 pts)

$n = 2.2 \text{ moles}$
 $V = 501.2 \text{ mL} \rightarrow \text{convert to L} \rightarrow 501.2 \text{ mL} \times \frac{1}{1000 \text{ mL}} = 0.5012 \text{ L}$
 $T = 278.2 \text{ K}$
 $P = ?$
 $P = \frac{nRT}{V} = \frac{(2.2 \text{ mol}) \left(\frac{0.08206 \text{ L atm}}{\text{mol K}} \right) (278.2 \text{ K})}{0.5012 \text{ L}}$

$$P = 100.2 \rightarrow 2 \text{ sig fig} \rightarrow 1.0 \times 10^2 \text{ atm.}$$

- EC (3 pts): If the total pressure of N₂ (g) and H₂ (g) is 1.2 atm and the pressure of H₂ is 0.8 atm, what is the pressure of the N₂ ?

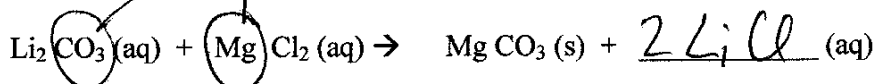
$$\begin{aligned} P_{\text{tot}} &= P_{\text{N}_2} + P_{\text{H}_2} & P_{\text{N}_2} &= 1.2 \text{ atm} - 0.8 \text{ atm} \\ P_{\text{N}_2} &= P_{\text{tot}} - P_{\text{H}_2} & P_{\text{N}_2} &= 0.4 \text{ atm} \end{aligned}$$

Name Key (print name) Name _____ (sign name)

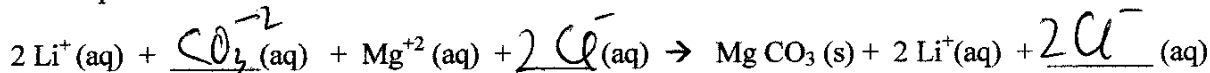
Please show all work for full credit & for partial credit for all questions.

1. Complete the following precipitation reaction by filling in each blank with an ion or molecule. (5 pts)

molecular equation



ionic equation



2. Circle the following which are weak acids (5 pts)

HNO_3 HF HCl CH_3COOH H_2SO_4

3. Assign oxidation state of the S in SO_3^{2-} (oxygen has ox state = -2)(show work).(4 pts)

$$S + 3(-2) = -2$$

$$S = -2 + 6 = +4$$

4. If you have 4.1 moles of a gas in 378.2 mL volume at 178.1 K, what is the pressure in atmospheres. [PV = nRT, R=0.08206 (L atm)/(mol K)] (I made up these numbers so the numbers have no relation to reality.) (6 pts)

$$n = 4.1 \text{ mol}$$

$$V = 378.2 \text{ mL} \rightarrow 378.2 \text{ mL} \times \frac{1 \text{ L}}{1000 \text{ mL}} = 0.3782 \text{ L}$$

$$T = 178.1 \text{ K}$$

$$P = ?$$

$$PV = nRT$$

$$P = \frac{nRT}{V} = \frac{(4.1 \text{ mol})(0.08206 \frac{\text{L atm}}{\text{mol K}})(178.1 \text{ K})}{0.3782 \text{ L}}$$

$$P = 158.4 \text{ atm} \rightarrow 2 \text{ sig fig} \rightarrow 1.6 \times 10^2 \text{ atm}$$

EC (3 pts): If the total pressure of $\text{O}_2(\text{g})$ and $\text{N}_2(\text{g})$ is 1.7 atm and the pressure of N_2 is 1.0 atm, what is the pressure of the O_2 ?

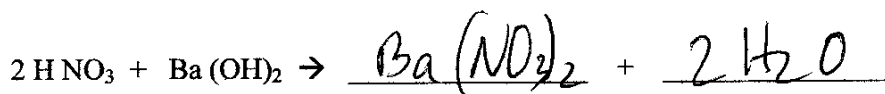
$$P_{\text{tot}} = P_{\text{O}_2} + P_{\text{N}_2}$$

$$P_{\text{O}_2} = P_{\text{tot}} - P_{\text{N}_2} = 1.7 \text{ atm} - 1.0 \text{ atm} = 0.7 \text{ atm}$$

Name Key Name _____
 (print name) (sign name)

Please show all work for full credit & for partial credit for all questions.

1 Complete the following Acid Base reaction by filling in the blanks. (5 pts, 2.5 pts each)



2. Circle the following which are strong bases. (Assume everything is completely soluble in water) (5 pts)

NH_3 NaOH $\text{Ba}(\text{OH})_2$ NH_4OH KOH

3. Assign oxidation state of the P in PO_4^{3-} (oxygen has ox state = -2) (show work). (4 pts)

$$P + 4(-2) = -3$$

$$P = -3 + 8 = +5$$

4. You have a gas cylinder in an internal combustion engine which contains a mixture of gases at 1.00 atm pressure, 298 K, with an initial volume of 1.78 Liters. If the piston in the gas cylinder is pushed in so that the volume of the gas becomes 0.98 Liters at a temperature of 320 K, what is the new pressure?

[(P_1V_1) / (P_2V_2) = T_1/T_2] (I made up these numbers so that the numbers have no relation to reality.) (6 pts)

$$\begin{aligned} P_1 &= 1.00 \text{ atm} \\ T_1 &= 298 \text{ K} \\ V_1 &= 1.78 \text{ L} \\ V_2 &= 0.98 \text{ L} \\ T_2 &= 320 \text{ K} \\ P_2 &= ? \end{aligned}$$

$$\frac{P_1 V_1}{P_2 V_2} = \frac{T_1}{T_2} \rightarrow \left(\frac{P_2 V_2}{P_1 V_1} = \frac{T_2}{T_1} \right) \text{ solve for } P_2 \text{ - algebra}$$

$$P_2 = \left(\frac{T_2}{T_1} \right) \frac{P_1 V_1}{V_2} = \frac{(320 \text{ K})(1.00 \text{ atm})(1.78 \text{ L})}{(298 \text{ K})(0.98 \text{ L})}$$

$$P_2 = 1.95 \text{ atm.} \rightarrow 2 \text{ sig fig}$$

$$P_2 = 2.0 \text{ atm}$$

EC (3 pts): If a gas is collected over water, and the total pressure is 722 mm Hg, if the water pressure is 5.0 mm Hg, what is the pressure of the gas?

$$P_{\text{total}} = P_{\text{gas}} + P_{\text{H}_2\text{O}} \rightarrow P_{\text{gas}} = P_{\text{total}} - P_{\text{H}_2\text{O}}$$

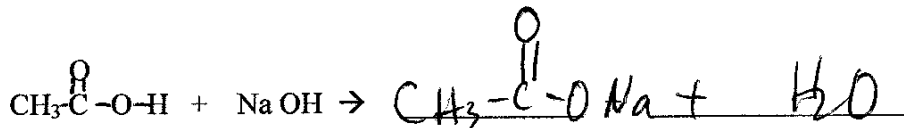
$$P_{\text{gas}} = 722 \text{ mmHg} - 5.0 \text{ mmHg}$$

$$P_{\text{gas}} = 717 \text{ mmHg}$$

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1. Complete the following Acid Base reaction by filling in the blanks. (5 pts, 2.5 pts each)



2. Circle the following which are weak bases (you should assume that everything is completely soluble in water) (5 pts)

NH₃ NaOH Ba(OH)₂ NH₄OH KOH

3. Assign oxidation state of the N in NO₃⁻ (oxygen has ox state = -2)(show work). (4 pts)

$$N + 3(-2) = -1$$

$$N = -1 + 6 = +5$$

4. You have a gas cylinder in an internal combustion engine which contains a mixture of gases at 5.22 atm pressure, 323K, with an initial volume of 5.23 Liters. If the piston in the gas cylinder is pushed out so that the volume of the gas becomes 10.7 Liters at a temperature of 323K, what is the new pressure?

[(P₁V₁)/(P₂V₂) = T₁/T₂] (I made up these numbers so that the numbers have no relation to reality.) (6 pts)

P₁ = 5.22 atm I want P₂ on top for easier algebra

$$T_1 = 323\text{K} \quad \frac{P_2 V_2}{P_1 V_1} = \frac{T_2}{T_1} \rightarrow \text{solve for } P_2 \quad P_2 = \frac{T_2 P_1 V_1}{T_1 V_2}$$

$$V_1 = 5.23\text{L}$$

$$V_2 = 10.7\text{L}$$

$$T_2 = 323\text{K}$$

$$P_2 = ? \quad P_2 = \frac{(323\text{K})(5.22\text{atm})(5.23\text{L})}{(323\text{K})(10.7\text{L})}$$

$$P_2 = 2.55\text{atm (3 sig fig)}$$

EC (3 pts) If a gas is collected over water, and the total pressure is 775 torr, if the water pressure is 2.2 torr, what is the pressure of the gas?

$$P_{\text{total}} = P_{\text{gas}} + P_{\text{H}_2\text{O}}$$

$$P_{\text{gas}} = P_{\text{total}} - P_{\text{H}_2\text{O}}$$

$$P_{\text{gas}} = 775\text{torr} - 2.2\text{torr} = 773\text{torr}$$

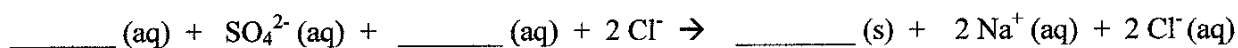
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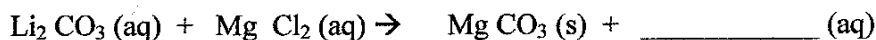
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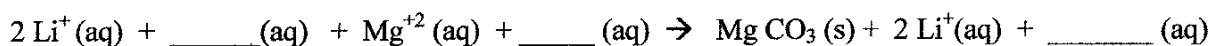
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