SC111: General Chemistry   NAME _____

Quiz 2   Circle your section
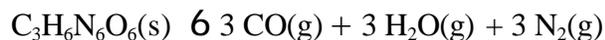*Dr. Joseph F. Lomax*   Section   3512
Dr. JudithAnn Hartman   Section   4311
15 Sept 2003

1.   a.   How many moles of gas would be needed to have a total volume of 1000. L at 1.028 atm and 1000 °C? (2 points)

b.   How many grams of RDX ($C_3H_6N_6O_6$, Molecular Mass: 222.11 g/mol) would be needed to produce this many mols of gases according to the reaction below? (2 points)

$$C_3H_6N_6O_6(s) \; 6 \; 3\,CO(g) + 3\,H_2O(g) + 3\,N_2(g)$$

2. Sketch a manometer with a gas sample connected to a mercury U-tube. On the gas side the mercury height is 25.0 cm. On the atomspheric side the mercury height is 32.7 cm. If the atmospheric pressure is 777.7 torr, what is the gas pressure in standard atm? (3 points)

3. Two bulbs connected by a valve are filled with ideal gases. One bulb has 125 mL and is at a pressure of 750. torr and the other has a volume of 525 mL and a pressure of 890. torr. What is the final pressure when the valve is opened between the two bulbs? (3 points)

MORE ON THE BACK SIDE!

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4. What is the density in g/L of the gas butane (C_4H_{10}, Molecular Mass: 58.12 g/mol) at 1.028 atm and 300. K? (3 points)

5. Give the oxidation number of the underlined element in the following compounds or ions. (3 points)

a. $H_2\underline{S}$

b. $H_2\underline{S}O_4$

c. $\underline{N}O^+$

6. For the following reaction, identify the species oxidized, reduced, the oxidizing agent and the reducing agent. (4 points)

      $Fe_2O_3 + 2\ Al\ 6\ 2\ Fe + Al_2O_3$

Oxidized   _____

Reduced   _____

The oxidizing agent   _____

The reducing agent   _____

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Key Quiz 2 Fall 2003– Lomax and Hartman

1. a. $PV = nRT$ 1.028 atm $\times$ 1000 L = n $\times$ .08206 (L·atm)/(mol·K) $\times$ (1000 + 273) K
n = 9.841 mol gas
   b. 9.841 mol gas $\dfrac{\text{| 1 mol RDX}}{\text{| 9 mol gas}}$ $\dfrac{\text{| 222.11 g RDX}}{\text{| 1 mol RDX}}$ = **242.8 g RDX**

2. (777.7 torr +7.7 cm Hg $\times$ 10 torr/cm Hg) = (777.7 +77) torr = 854.7 torr $\times$ 1 atm/760 torr = **1.12 atm**

3. 125 mL $\times$ 750. torr + 525 mL $\times$ 890. torr = (125 + 525) mL $\times$ P_{tot} **P_{tot} = 863 torr = 1.14 atm**

4. Assume one liter: n = PV/nT = (1.028 atm $\times$ 1 L)/(.08206 (L·atm)/(mol·K) $\times$ (300)
n = 0.04176 mol/L
0.04176 mol/L $\times$ 58.12 g/mol = 2.43 g/L

5.
a. $H_2\underline{S}$ $2\times(+1) + S = 0$ S = &2

b. $H_2\underline{S}O_4$ $2\times(+1) + S + 2\times(\&2) = 0$ S = +6

a. $\underline{N}O^+$ $N + (\&2) = \&1$ N = +3

6. $Fe_2O_3 + 2\ Al\ \mathbf{6}\ 2\ Fe + Al_2O_3$

Oxidized   _____Al_____

Reduced   ___Fe_2O_3 _____

The oxidizing agent   ___Fe_2O_3 _____

The reducing agent   _____Al_____