AP Chemistry Problem Set #2

1. _____C_____ 2. _____B_____ 3. _____A_____ 4. _____D_____ 5. _____C_____

6. _____C_____ 7. _____A_____ 8. _____A_____ 9. _____E_____ 10. _____C_____

1. Measurements indicate a charge of 0.444 C passes a point in 0.12 seconds. The current (i.e., the rate of charge flow, in C/s) is best expressed as:
    a. 0.27 C/s   b. 0.270 C/s   **c. 3.7 C/s**   d. 3.70 C/s   e. 3.700 C/s

2. A given sample contains 2.0 g of hydrogen, 33.1 g of sulfur, and 75.01 g of oxygen. What is the total mass of the sample?
    a. 110.12 g   **b. 110.1 g**   c. 110. g   d. 1.1×10^2 g   e. 1.1×10^{-2} g

3. The correct name for $Mg(OH)_2$ is:
    a. magnesium hydroxide   b. magnesium(I) hydroxide   c. magnesium(II) hydroxide
    d. magnesium(II) hydroxide(I)   e. magnesium hydrogen oxide

4. The correct name for Co_2O_3 is:
    a. cobalt oxide   b. cobalt(II) oxide   c. cobalt oxide(III)
    d. cobalt(III) oxide   e. dicobalt trioxide

5. The density of copper is 8.96 g/cm^3. What is the mass of 18.88 cm^3 of pure copper?
    a. 1.69 g   b. 16.9 g   **c. 169 g**   d. 169.0 g   e. 1690 g

6. What is the correct formula for copper(II) phosphate:
    a. $CuPO_4$ b. CuP **c. $Cu_3(PO_4)_2$**   d. Cu_2P e. Cu_2PO_4

7. The density of a piece of metal can be determined from mass and water displacement data. A piece of metal with a mass of 15.54 g is placed in a flask with a volume of 50.00 cm^3. It is found that 40.54 g of water (d=0.9971 g/cm^3) is needed to fill the flask with the metal in it. The density of the metal is most nearly (all answers in g/cm^3):
    a. 1.66   b. 1.7   c. 9.46   d. 9.5   e. 40.7

8. Examples illustrating the Law of Multiple Proportions shown are:
    I. CO & CO_2
    II. Ca & BaO
    III. CaS & BaS
    IV. Na_2CO_3 & Na_2SO_4
    V. O_2 & O_3

    a. I only   b. I & V   c. III & IV   d. III & V   e. I & III

9. Which of the following is correctly named?
    a. NH_4^+, ammonia   b. $SbCl_5$, antimony hexachloride   c. N_2O_5, nitrogen pentoxide
    d. $CaCl_2$ calcium(II) chloride   **e. Hg_2Cl_2, mercury(I) chloride**

10. Which of the following elements is a transition metal?
    a. Ca   b. S   **c. Fe**   d. N   e. Cs

11. Complete the following table:

#p	#n	#e-	mass #	atomic #	net charge	symbol
11	**12**	**10**	23	11	1+	$^{23}_{11}\text{Na}^{1+}$
1	0	0	**1**	**1**	**1+**	$^{1}_{1}\text{H}^{1+}$
34	45	36	79	34	2-	$^{\textbf{79}}_{\textbf{34}}\textbf{Se}^{2-}$
85	125	**85**	**210**	**85**	0	$^{210}_{85}\text{At}$
79	**118**	76	197	**79**	**3+**	$^{197}_{79}\text{Au}^{3+}$
19	22	18	**41**	19	**1+**	$^{41}_{19}\text{K}^{1+}$

12. Name each of the following compounds:
a. FeO – **iron(II) oxide**
b. Fe_2O_3 – **iron(III) oxide**
c. PCl_5 - **phosphorus pentachloride**
d. H_2SO_4 – **sulfuric acid**
e. V_2O_5 - **vanadium(V) oxide**

f. $NaHCO_3$ – **sodium bicarbonate**
g. K_2SO_3 – **potassium sulfite**
h. $CoCrO_4$ – **cobalt(II) chromate**
i. Hg_2O – **mercury(I) oxide**
j. $(NH_4)_3PO_4$ – **ammonium phosphate**

13. Write the formulas for each of the following compounds:
a. calcium fluoride – $\textbf{CaF}_2$
b. dinitrogen tetrafluoride – $\textbf{N}_2\textbf{F}_4$
c. carbonic acid – $\textbf{H}_2\textbf{CO}_3$
d. sodium sulfite – $\textbf{Na}_2\textbf{SO}_3$
e. titanium(IV) oxide – $\textbf{TiO}_2$
f. potassium permanganate – $\textbf{KMnO}_4$

g. nitric acid – $\textbf{HNO}_3$
h. chromium(III) carbonate – $\textbf{Cr}_2(\textbf{CO}_3)_3$
i. carbon tetrachloride – $\textbf{CCl}_4$
j. mercury(I) phosphate – $(\textbf{Hg}_2)_3(\textbf{PO}_4)_2$
k. hydrofluoric acid – **HF**
l. sulfur trioxide – $\textbf{SO}_3$

14. Identify each of the following elements:
a. a member of the same family as oxygen whose most stable ion contains 54 electrons - **Te**
b. a noble gas with 18 protons in the nucleus - **Ar**
c. a halogen with 85 protons and 85 electrons - **At**
d. a member of the alkali metal family whose most stable ion contains 18 electrons - **K**
e. a member of group 17 whose most stable ion contains 10 electrons - **F**

15. Suppose that a stable element, atomic number 119, symbol Pe, name Petrassium, is discovered.
a. Would Pe be a metal or a non-metal? Explain/justify your answer. – **metal due to its location on the left side of the periodic table**
b. What would be the most likely charge of the Pe ion in stable ionic compounds? – **1+**
c. An isotope of Petrassium has a mass number of 291. How many neutrons does it have? - **172**
d. Write the formula for the compound formed between Pe and the carbonate ion. – $\textbf{Pe}_2\textbf{CO}_3$