Chemistry I Name _____

Date _____ Per ____

Semester II Review (Worksheets #27 on up)

1. Write the formula for each of the following:

magnesium iodide _____ potassium hydroxide _____

aluminum nitrate _____ calcium manganate _____

lithium chlorate _____ sodium phosphate _____

beryllium nitride _____ aluminum dichromate _____

cesium chromate _____ ammonium oxide _____

rubidium peroxide _____ magnesium carbonate _____

potassium cyanide _____ strontium acetate _____

ammonium persulfate _____

2. For each of the following, predict the products for, balance, and classify (synthesis, double displacement, etc.):

a) ___ $CuO(s)$ ----> _____ _____

b) ___ $Al(s)$ + ___$AgNO_3(aq)$ ----> _____ _____

c) ___ $N_2(g)$ + ___ $H_2(g)$ ----> _____ _____

d) ___$AgNO_3(aq)$ + ___ $HCl(aq)$ ---> _____ _____

e) ___ $Cs(s)$ + ____$S_8(s)$ ----> _____ _____

f) ___ $C_4H_{10}(g)$ + ____$O_2(g)$ ----> _____ _____

g) ___ $C_2H_7OH(g)$ + ____$O_2(g)$ ----> _____ _____

h) ___ $C_2H_8O_2(g)$ + ____$O_2(g)$ ----> _____ _____

i) ___ $C_6H_6(l)$ + ____$O_2(g)$ ----> _____ _____

3. Here are the **General Rules for Solubility of Ionic Compounds (Salts) in Water at 25ºC**

Solubility Rules

1. -nitrate and -acetate = (aq)
2. Group 1 (H+, Li+, Na+, K+, Rb+, Cs+, Fr+) and NH_4+ = (aq)
3. -chloride, -bromide, and -iodide = (aq)
   EXCEPT when with Pb, Hg_2, or Ag = (s)
4. -sulfate = (aq)
   EXCEPT when with Ba, Ca, Pb, or Hg_2 = (s)
5. - hydroxide = (s)
   EXCEPT when with Group 1 or NH_4+ = (aq)
   When with Group 2 (Be, Mg, Ca, Sr, Ba, Ra) = (ss)
6. -sulfide, -carbonate, and -phosphate = (s)
   EXCEPT when with Group 1 or NH_4+ = (aq)

a) Will the following be (aq) or (s) in water?

_____ $AgNO_3$, _____ CaS, _____ $(NH_4)_2CO_3$, _____ $Ca(C_2H_3O_2)_2$

_____ $Al_2(SO_4)_3$, _____ $Ba(OH)_2$, _____ $MgCO_3$, _____ AgCl

b. What will be the precipitate when aqueous solutions of the following are mixed?

sodium sulfate + lead (II) acetate _____

ammonium phosphate + aluminum bromide _____

strontium iodide + lithium sulfide _____

4. How many grams does 1.000 mole of potassium weigh? _____

5. How many atoms are in 3.78 moles of carbon? _____

6. How many molecules are in 45.98 grams of water? _____

7. How much would 3.51×10^{26} molecules of $MgBr_2$ weigh? _____

8. What is the percent composition of water?

9. What's the empirical formula of a substance that is 64.26% carbon, 7.19% hydrogen, and 28.54% oxygen?

10. Another substance is 73.41% phosphorus, 20.01% nitrogen, and 6.58% lithium. Its molecular mass is 632.82 grams per mole. What is its molecular formula?

11. What's the percent of water in the hydrate chromium(IV) sulfide tetrahydrate ?

12. When a 88.27 gram sample of $LiNO_3 \cdot x\ H_2O$ is heated, 38.27 grams of the anhydrous salt remains. What is the value of x?

13. When a 54.69 gram sample of a hydrate of rubidium nitrate ($RbNO_3 \cdot x\ H_2O$) is heated, 10.74 grams of water are driven off. What is the formula of the hydrate of rubidium nitrate?

14. How many grams of carbon dioxide could you make if you burned 25.98 grams of methane (CH_4) in pure oxygen gas? (Write out the balanced equation first.)

15. If you had 25.00 grams of silver(I) nitrate and mixed it with 15.00 grams of calcium chloride, you would end up with a precipitate.

a. What would the precipitate be? _____

b. What would be the limiting reactant? _____

c. How many grams of the precipitate would you make? _____

16. If you're burning ammonia gas in the lab at STP according to this equation,

___$NH_3(g)$ + ___$O_2(g)$ => ___$N_2(g)$+ ___$H_2O(g)$

a. How many liters of nitrogen gas could you make if you burned 35.7 L of ammonia?

b. How many grams of oxygen gas would you need to make 49.22 L of nitrogen gas?

c. How many grams of $H_2O(g)$ could you make with 1.700 L of ammonia?

17. A sample of oxygen gas occupies a volume of 865. mL at 725. torr pressure. What volume will it occupy at 15.6 psi pressure?

18. A sample of nitrogen occupies a volume of 250. mL at 19ºC. What volume will it occupy at 82 ºC?

19. A sample of carbon dioxide occupies a volume of 755 mL at 118 kPa pressure. What pressure would the gas exert if the volume was increased to 1.35 liters?

20 Chlorine gas is at a temperature of 37.ºC when it occupies a volume of 22.4 liters. To what temperature should it be raised to occupy a volume of 50.0 liters? (Answer in ºC)

21. A 10.5 L balloon at 24ºC and 1.02 atm is carried up a mountain, where the temperature is 18ºC and the pressure is 755 torr. What will the new volume of the balloon be?

22. What volume will 37.96 grams of CO_2 occupy at 45ºC and 805 torr?

23. How many grams of He would be in a 7.50 L balloon at 21ºC and 14.5 psi?

24) You can generate oxygen by heating potassium chlorate according to the following equation:

____$KClO_3(s)$ ---> ____$KCl(s)$ + ____$O_2(g)$

Let's say you needed to produce 455 mL of $O_2(g)$ at 1.02 atm and 22ºC. How many grams of potassium chlorate would you need?

25. A 163.0 mL sample of oxygen is collected over water at 23ºC and 770.0 torr. What is the volume of the dry gas at STP? (Vapor pressure of water at 23ºC = 21.1 torr.)

26. In the space below, draw a graph of the heating curve of H_2O going from -20 ºC to 120ºC. Label the places on the graph that show water boiling and ice melting. Then use a dotted line to show what happens to the graph when salt is added to the water.

For the last four problems, (a) provide the balanced equation and (b) write out the net ionic equation. Make sure your balanced equation has the right (aq)'s, (s)'s, (l)'s and (g)'s.

27. lead IV acetate + ammonium chloride

(a)_____

(b)_____

28. (a)____ LiBr (aq) + ___ F_2(g) ---> ___ LiF (aq) + ___ Br_2 (l)

(b)_____

29. Aqueous ammonium dichromate plus aluminum sulfate reacts to form solid aluminum dichromate plus ammonium sulfate.

(a)_____

(b)_____

30. (a)____ Na_2CO_3 (aq) + ___ HCl(aq) ---> ___ NaCl(aq) + ___ H_2O (l)+ ___ CO_2 (g)

(b)_____

That's it up to acids and bases. Study well! Feel free to e-mail me with any questions: depalatis_laurel@asdk12.org