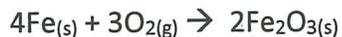1. If steel wool (iron) is heated until it glows and placed in a bottle containing pure oxygen, the iron reacts spectacularly to produce iron(III)oxide.

    $4Fe_{(s)} + 3O_{2(g)} \rightarrow 2Fe_2O_{3(s)}$

    a. What is the theoretical yield of Fe_2O_3 when 0.125 g of iron is heated in pure oxygen gas?

    b. What volume of $O_{2(g)}$ at STP is required to produce 0.1085 g of Fe_2O_3?

2. A student titrates a 12.0 mL sample of H_2SO_4, according to the reaction:

    $2KOH + H_2SO_4 \rightarrow K_2SO_4 + 2H_2O$ The H_2SO_4 has a molarity of 0.185 M. What is the molarity of the KOH if 18.6 mL are required for the titration?

3. What is the theoretical yield (in grams) of N_2 when 18.1 g of NH_3 are reacted with 90.4 g of CuO according to the equation: $2NH_{3(g)} + 3CuO_{(s)} \rightarrow N_{2(g)} + 3Cu_{(s)} + 3H_2O_{(g)}$
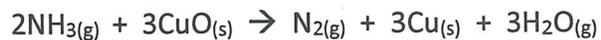
a. If 7.64 L of nitrogen gas is actually formed in the experiment (question 3), what is the percent yield?

4. Circle the atom with the larger radius: P   Na

5. Circle the atom with the higher ionization energy: Mg   Ba

6. Circle the atom with the greater electronegativity: O   Te

7. Write the electron configuration (full notation) for the following:

   a. S

   b. Cl⁻

8. Write the electron configuration (core notation) for the following:

   a. Mn^{2+}

9. Complete the following table:

Element	# of valence electrons	# of unpaired valence electrons
P		
Cl		
Mg		
S		

10. Which of the following would form covalent bonds:
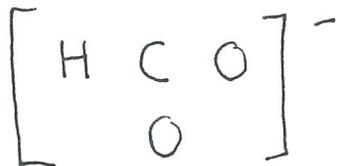
    a. N and I

    b. Fe and Cl

    c. Ba and O

    d. Si and S

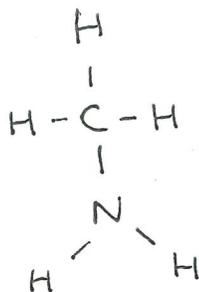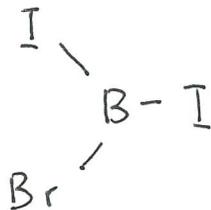11. Draw the Lewis Structure for the following:

    H C N

12. Draw the Lewis Structure for the following:

$$\left[\begin{array}{ccc} H & C & \ddot{O} \\ & O & \end{array}\right]^{-}$$

13. Circle the substances that you expect to conduct electricity:

$K_2CrO_4(aq)$ $Cu_{(s)}$ $Ba(OH)_2(s)$ $HNO_3(aq)$

14. For each molecule, name the strongest intermolecular force: (London dispersion, dipole-dipole or hydrogen bonding)

$$\begin{array}{c} \overset{I}{\underset{Br}{\diagdown}} B - I \end{array}$$

$$\begin{array}{c} H \\ | \\ H - C - H \\ | \\ \underset{H \diagup \quad \diagdown H}{N} \end{array}$$

$$H - C \equiv C - H$$

15. What is the $[K^+]$ formed when 3.75 g of K_2CrO_4 is dissolved and diluted to 0.800 L?