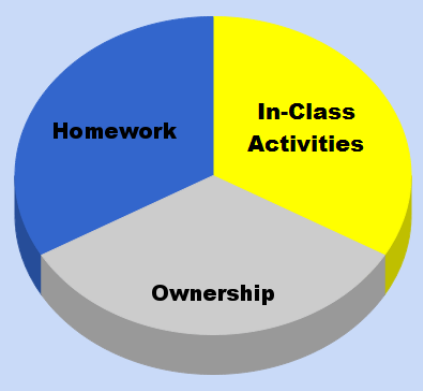
CHEM 121 – Worksheet 23 – Fall 2015

Monday Name: _____

Wednesday Name: _____



Directions: Complete the worksheet 100% prior to class 16 November 2015. Be prepared to go to the board during class.

1) List the three definitions of oxidation in your own words. Find examples other than in Dr. C's notes and list one with each definition.

2) List the three definitions of reduction in your own words. Find examples other than in Dr. C.'s notes and list one with each definition.

3) Using your skills from previous coursework, indicate the charge changes in the following balanced reaction: $4Fe + 3O_2 \rightarrow 2Fe_2O_3$

4) Elements always have a charge of _____.

5) Compounds always have an overall charge of _____.

6) Polyatomic ions (circle one) **always never** have a charge.

7) Using your skills from previous coursework, indicate the charge changes in the following balanced reaction: $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$.

8) What is the oxidizing agent in #'s 3 and 7? Reducing agent? How do you know?

9) Using your skills from previous coursework, indicate the charge changes in the following balanced reaction: $2H_2S + 3O_2 \rightarrow 2H_2O + 2SO_2$.

10) What is the oxidizing agent in #9? Reducing agent? How do you know?

11) Pt, Pd and Ni are used as catalysts in hydrogenation reactions.

a) What is a catalyst, in your own words?

b) Under what hybridization do these three metals go?

c) What is their geometry when they hybridize? Draw it below, as well as explain it.

12) Using your own format, summarize oxidation and reduction in tabular, reference, form, below.

13) What is the active ingredient in Clorox? How do you write it out in words? Formula?

14) Determine the oxidation numbers for the following chemicals:

A) BaO

B) CaO

B) MgO

C) Na_2O

C) B_2O_3

D) SO_2

D) CO_2

E) P_2O_5

E) SO_3

F) NO

15) Which of the chemicals, above, in #14 are acidic anhydrides? Write the complete reactions for those with water. Label each reactant and each product.

16) Which of the chemicals, above, in #14 are basic anhydrides? Write the complete reactions for those with water. Label each reactant and each product.

17) How do Pd, Pt and Ni act as catalysts for hydrogenation reactions? You'll have to go to the library for this: no googling! Xerox the page of the chemistry text you used as your source and staple it to this worksheet for turn in.

18) Identify the species being oxidized and reduced in each of the following reactions:

a. $Cr^{+} + Sn^{4+} \rightarrow Cr^{3+} + Sn^{2+}$

b. $3\ Hg^{2+} + 2\ Fe\ (s) \rightarrow 3\ Hg_2 + 2\ Fe^{3+}$

c. $2\ As\ (s) + 3\ Cl_2\ (g) \rightarrow 2\ AsCl_3$

19) Would you use an oxidizing agent or reducing agent in order for the following reactions to occur? Why?

a. $ClO_3^- \rightarrow ClO_2$

b. $SO_4^{2-} \rightarrow S^{2-}$

c. $Mn^{2+} \rightarrow MnO_2$

d. $Zn \rightarrow ZnCl_2$

20) In #18, identify the species that is the oxidizing agent and the reducing agent.

21) Write out your own redox combination reaction (not one from the notes). Balance it, show the charges on each atom, write the name of each compound and/or ion.

22) Write out your own non-redox combination reaction (not one from the notes). Balance it, show the charges on each atom, write the name of each compound and/or ion.

23) Write out your own double replacement reaction (not one from the notes). Balance it, show the charges on each atom, write the name of each compound and/or ion.

24) Write out your own redox decomposition reaction (not one from the notes). Balance it, show the charges on each atom, write the name of each compound and/or ion.

25) Write out your own non-redox decomposition (not one from the notes). Balance it, show the charges on each atom, write the name of each compound and/or ion.