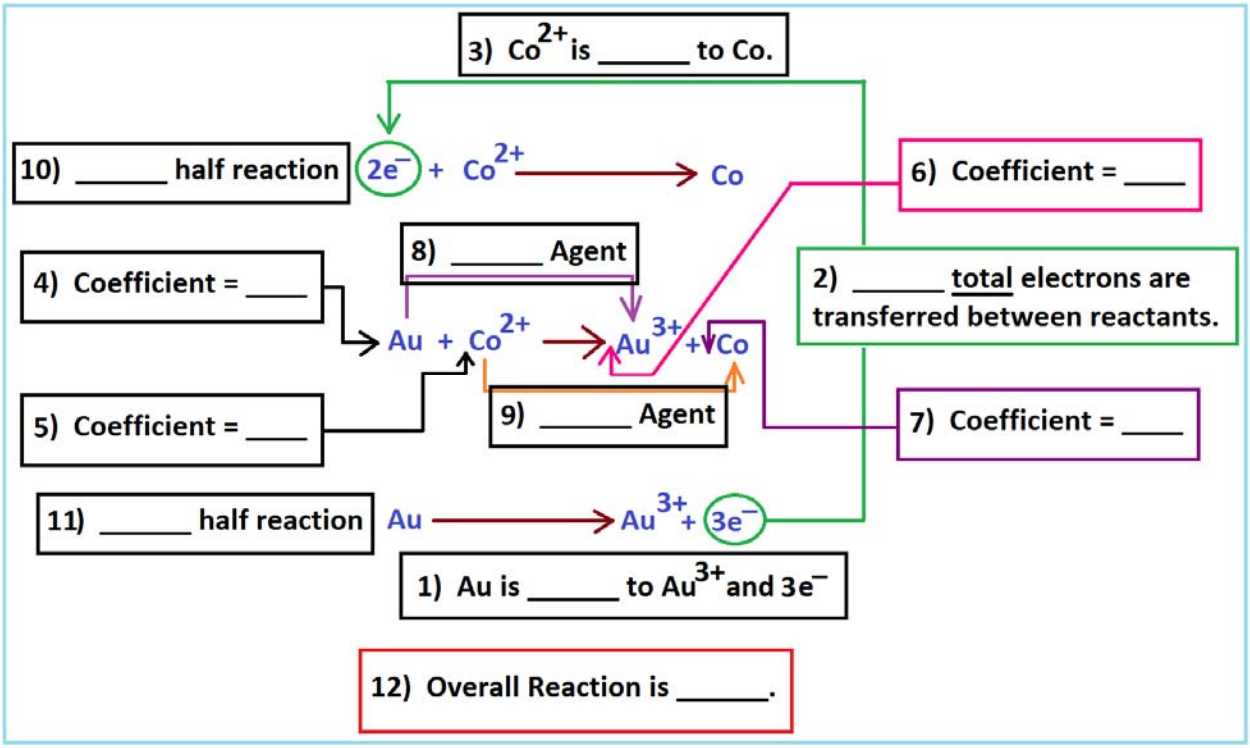
Monday Name: _____

Wednesday Name: _____

Directions: first 40 minutes with your partner, your non-programmable calculator and no notes; next 10 minutes with notes; last 25 minutes on board.

Questions 1-12 – complete the statements on the graphic in the space beneath it:



1)

2)

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12)

13) Define reduction. Give an example of a reduction half reaction.

14) Define oxidation. Give an example of an oxidation half reaction.

15) Given the following reaction, mark above it Reactants and Products on the correct side of the arrow.

$$Al + Cu^{2+} \rightarrow Al^{3+} + Cu$$

16) Mark below the reaction in #15 which reactant is reduced and which reactant is oxidized.

17) Balance the reaction in #15, above.

18) Mark above the reaction in #15 which reactant is the reducing agent and which reactant is the oxidizing agent.

19) Write the half reaction for Al in the space below:

What kind of reaction is this?

20) Write the half reaction for Cu^{2+} in the space below:

What kind of reaction is this?

21) What is the electronic configuration of Al?

22) What is the electronic configuration of the Al^{3+} ion?

23) In chemistry, there is a system known as the "ous" and "ic" system of nomenclature of ions. This system is used with metallic elements that have two (2) or more ionic forms and focuses on the two (2) most common ionic forms.

In this system, the ion with the lowest (least, smallest) charge has "ous" ("ous" is less") added to its stem, which may be English or Latin, depending on the metal, e.g., "ironous" doesn't "flow" – use "ferrous", instead.

The ion with the highest (biggest, most) charge has "ic" ("ic" is more) added to it in the same manner as the "ous" form, e.g., copper has two common oxidation states: +1 and +2. Cu^{1+} is the cuprous ion and Cu^{2+} is the cupric ion.

With that in mind, name the following ions using "ous" or "ic".

A) Fe^{2+}

B) Fe^{3+}

C) Pb^{2+}

D) Pb^{4+}

E) Zn^{2+}

F) Zn^{4+}

G) Cu^{1+}

H) Cu^{2+}

I) Hg_2^{2+} (careful with this one!)

J) Hg^{2+}

24) In order to separate metallic cations from each other, qualitative analysis schemes have been developed over the centuries: indeed, you have an experiment on qual coming up in lab soon that will illustrate some of these concepts.

To separate the cations from each other, one must form an insoluble precipitate between one metallic cation and an anion from an acid, base or salt. An insoluble precipitate is a solid that settles to the bottom of the mixture either on its own or with the help of a centrifuge. This means that chemical reactions must take place, e.g., when Ag(I) (another way of the writing the silver 1+ ion) reacts with the chloride ion from HCl (hydrochloric acid), silver chloride (AgCl) forms and precipitates.

With this information, **complete and balance** the following reactions based on the separation scheme on p. 33 of your notes:

A) Pb(II) + $Cl^- \rightarrow$ _____

B) Hg(I) (careful with this one!) + $Cl^- \rightarrow$ _____

C) $Cu(II) + S^{2-} \rightarrow$ _____

D) $Pb(II) + S^{2-} \rightarrow$ _____

E) $Sb(III)\ S^{2-} \rightarrow$ _____

F) $Hg(II)\ S^{2-} \rightarrow$ _____

G) $Ca(II) + Co_3^{2-} \rightarrow$ _____

H) $Ba(II) + Co_3^{2-} \rightarrow$ _____

25) Explain what “malleable” means.

26) Explain what “ductile” means.

27) List and define the 6 common tooth filling substances in the space below.

28) List and explain the difference between the three kinds of steel in the space below.

29) List and explain the difference between the three types of tin in the space below.

30) What is the % Ag in German silver?

31) List and explain the three kinds of magnetism in the space below.

32) Draw a simple diagram of a Guoy balance and explain how it works with paramagnetism in the space below.

33) Draw a diagram of a galvanized nail and explain how galvanization prevents the nail from rusting.

34) Explain how the thermite reaction works – write out the thermite reaction – draw a rough sketch of how it works.

35) Explain why He is better for deep diving than N_2. Include a sketch with your narrative.