PS Chemistry Notes Date_____

Determining the Oxidation Number

Rules to remember…

Cation-

Anion-

1. **The cation is written _____ in a formula, followed by the anion.**
   For example, in NaH, the H is ____;
   in HCl, the H is ____.

Mono-

2. **The oxidation number of a monatomic ion _____.**
   For example, the oxidation number of Na^+ is ___;the oxidation number of N^{3-} is ____.

Rules to remember…

3. **The oxidation number of hydrogen is ____ in _____ of its compounds.**
   Exception: In _____, the oxidation number of hydrogen is ___, as in CaH_2.

4. **The oxidation number of oxygen in compounds is _____.** The oxidation # of most _____elements is ____.

Oxidation # can be written as ___ or ___

Rules to remember…

Group 1- Alkali Metals

5. **The oxidation number of a Group 1 element in a compound is ____.**

Group 2- Alkali Earth Metals

6. **The oxidation number of a Group 2 element in a compound is ____.**

Group 17- Halogen Gases

7. **The oxidation number of a Group 17 element in a compound is ____,** except when that element is combined with one having a higher electronegativity**. It is -1 _____.**

Rules to remember…

8. **The _____ of the oxidation numbers of all of the atoms in a _____ compound is _____.**
   _____ = _____, for example
   ( ) + ( ) =

9. **The _____ of the oxidation numbers in a _____ ion is equal to the _____.**
   For example, the sum of the oxidation numbers for SO_4^{2-} is

Polyatomic Ion-

The entire ion (SO_4) is -2.

Example 1…

Determine the oxidation number of carbon in $K_2C_2O_4$.

- Na is ___(Group ___)…but there are ___ of them so…( )( ) =

Rule #5

- O is ___(Group ___)…but there are ___ of them so…( )( ) =

Rule #4

- Do the math...add ____and ____
  ( ) + ( ) =

Remember =

- Refer to rule #___…the sum of the oxidation numbers of all atoms in a neutral compound is zero…so ( ) + ? = 0
  The oxidation number of carbon = _____

Example 2…

Determine the oxidation number of the metal in Fe_2O_3.

- O is ___(Group ___)…but there are ___ of them so…( )( ) =

Rule #4

Refer to rule #___…the sum of the oxidation numbers of all atoms in a neutral compound is zero…so ( ) + ? = 0

?= _____ BUT there are ___ atoms of Fe, so…

( )/2 =

The oxidation number of Fe is ____.

Remember to include the + symbol if the oxidation # is positive.

Example 3…

Determine the oxidation number of phosphorus in PO_4^{-3}.

PO_4^{-3} is not a neutral compound

Rule #4

- O is ___(Group ___)…but there are ___ of them so…( )( ) =
- Do the math…

(?) + ( ) = -3

The oxidation number of P = _____

?
+
_____
= -3

Practice…

Determine the oxidation numbers of the identified ion in each of the following.

Mn 1) MnO_2

Cu 2) Cu_2O

S 3) K_2SO_4

C 4) $K_2C_2O_4$

B 5) $NaBH_4$

Homework

Determining Oxidation Numbers
Due tomorrow.

#10…keep (NH_4) together as a polyatomic ion with a +1 charge.

HINT NH_4^{+1}