Name: ______________________________

# SNC2D Chemistry Review

What is the ionic charge of each of the following ions?

| | | | |
|---|---|---|---|
| Potassium | +1 | Oxide | -2 |
| Iron (III) | +3 | Phosphorus | -3 |
| Carbonate | -2 | Ammonium | +1 |
| Chloride | -1 | Silver | +1 |
| Hydroxide | -1 | Sulfate | -2 |

Any alkali metal: +1

Any alkaline earth metal: +2 Any halogen: -1

What does the (aq) written beside the formula for an acid stand for? What does it mean?

**Aqueous – dissolved in water/in solution.**

What are four differences between molecular and ionic compounds?

| Molecular | Ionic |
|---|---|
| Covanlent bonds | Ionic bonds |
| Non-metals | Metal + Non-metal/polyatomic |
| low melting point | High melting point |
| Not usually water soluble | Soluble in water |

Given the list below,

- Draw a wavy underline beneath those compounds that are acids. Name these compounds.
- Draw a circle around those compounds that are molecular. Name these compounds.
- Draw a double underline beneath those compounds that contain polyatomic ions and look up the formula and valence charge of the ion.
- Draw a star next to those compounds that contain multivalent metals. Determine the valence charge of the metal based on how it is combining with the negative ion. Name these compounds.
- Name all remaining compounds.

$Al(OH)_3$ **Aluminum hydroxide**

$HBr_{(aq)}$ **hydro bromic acid**

$NH_3$ **ammonia**

$AgNO_3$ **silver nitrate**

$CaS$ **calcium sulfide**

$SO_3$ **sulfur trioxide**

$PbF_4$ **lead (iv) fluoride**

$NH_4NO_3$ **ammonium nitrate**

$P_2S_4$ **diphoshorus terasufide**

$K_2SO_4$ **Potassium sulfate**

$NaHCO_3$ **sodium bicarbonate**

calcium hydroxide **$Ca(OH)_2$**

sulfuric acid **$H_2SO_4$**

sodium hydroxide **NaOH**

beryllium phosphide **$Be_3P_2$**

lead (II) nitrate **$Pb(NO_3)_2$**

lithium bicarbonate **$LiHCO_3$**

magnesium chloride **$MgCl_2$**

nitric acid **$HNO_3$**

$Fe_2O_3$ **iron (iii) oxide**

$Cu_3N_2$ **Copper (ii) nitride**

$NiSO_4$ **nickel sulfate**

$Na_3P$ **sodium phosphide**

$H_3PO_{4(aq)}$ **phosphoric acid**

$AuCl_3$ **gold (iii) chloride**

$PBr_5$ **phosphorus pentabromide**

$OF_2$ **oxygen difluoride**

$ZnCl_2$ **zinc chloride**

$CCl_4$ **carbon tetrachloride**

$C_6H_{12}O_6$ **Glucose**

strontium nitride **$Sr_3N_2$**

methane **$CH_4$**

calcium carbonate **$CaCO_3$**

carbon monoxide **CO**

aluminum fluoride **$AlF_3$**

copper (I) oxide **$Cu_2O$**

hydrogen peroxide **$H_2O_2$**

sulfur hexafluoride **$SF_6$**

For each of the following word equations, write the balanced chemical equation:

1. ___$Pb(NO_3)_2$ + __$Na_2SO_4$ ➔ __$PbSO_4$ + _**2**___$NaNO_3$

Word equation: **Lead (ii) Nitrate + Sodium Sulfate ➔ Lead (ii) Sulfate + Sodium Nitrate**

2. _**2**_$NaN_3$ ➔ __**2**_Na + _**3**_$N_2$

Word equation: **Sodium Nitrate ➔ Sodium + Nitrogen Gas**

3. _**2**_ KI +_____Br2 ➔ **2**_KBr +___$I_2$

Word equation: **Potassium iodite+ bromine gas ➔ potassium bromide + iodine solid**

4. _**2**_ $Ni_2O_3$ ➔_**4**__ Ni +_**3**_ $O_2$

Word equation: **nickel (III) oxide ➔ nickel + oxygen gas**

5. ____ $CS_2$ + _**3**__ $O_2$➔ ___ $CO_2$ + _**2**__$SO_2$

Word equation: **carbon disulfide + oxygen ➔ carbondioxide + sulfur dioxide**

For each of the following skeleton chemical equations, write the word equation and balance the equation:

1. Methane + oxygen ➔ carbon dioxide + water

   $CH_4 + 2\ O_2$ ➔ $CO_2 + H_2O$

2. barium + oxygen ➔ barium oxide

   $2\ Ba + O_2$ ➔ $2\ BaD$

3. aluminum bromide + fluorine ➔ aluminum fluoride + bromine

   $2\ AIBr_3 + 3\ F_2$ ➔ $2\ AIf_3 + 3\ Br_2$

4. lithium sulfate + barium chloride ➔ lithium chloride + barium sulfate

   $L\ i_2\ SO_4 + BaCl_2$ ➔ $2\ LiCl + BaSO_4$

5. nitric acid + calcium hydroxide ➔ calcium nitrate + water

   $2\ HND_3 + Ca(OH)_2$ ➔ $Ca(NO_3)_2 + 2\ H_2O$

What does balancing chemical equations have to do with the law of conservation of mass?

**Atoms can neither be created or destroyed, they can't just appear/disappear so there must be the same number of each type of atom on each type of the equation.**

Identify the type (synthesis, decomposition, single displacement, double displacement, or combustion) of each of the following reactions:

magnesium + oxygen ➔ magnesium oxide Type: **S**

copper (II) chloride + aluminum ➔ aluminum chloride + copper Type: **SD**

propane + oxygen ➔ carbon dioxide + water Type: **Combustion**

calcium carbonate ➔ calcium oxide + carbon dioxide Type: **D**

sulfuric acid + sodium hydroxide ➔ sodium sulfate + water Type: **Neutralization (DD)**

$FeCl_3 + Mg \rightarrow MgCl_2 + Fe$ Type: **SD**

$NaN_3 \rightarrow Na + N_2$ Type: **D**

$Mg(OH)_2 + AgNO_3 \rightarrow Mg(NO_3)_2 + AgOH$ Type: **DD**

$H_2 + O_2 \rightarrow H_2O$ Type: **S**

$CH_4 + O_2 \rightarrow CO_2 + H_2O$ Type: **Combustion**

Predict the products of each of the following reactions:

magnesium + nitrogen➔ **Magnesium Nitride** (synthesis)

strontium hydroxide + lead (II) bromide ➔ **strontium bromide** + **Lead (ii) hydroxide**

aluminum iodide + bromine ➔ **aluminum bromide + iodine**

hydrochloric acid + sodium hydroxide ➔ **sodium chloride + water**

glucose + oxygen ➔ **carbon dioxide+ water**

Li + $O_2$ ➔ **Li$O_2$** (synthesis)

Na$C_1$ ➔ **Na + C$i_2$** (decomposition)

$K_2SO_4$ + Al ➔ **$Al_2$ $(SO_4)_3$+ K**

$CaBr_2$ + $Ba(NO_3)_2$ ➔ **Ca(NO3)2 + BaBr**

$C_4H_{10}$ + $O_2$➔ **CO2 +H2O + energy**

One of the reactions above is the reaction for cellular respiration. Which one?

$C_4H_{10}$ + $O_2$➔ **CO2 +H2O + energy**

The opposite reaction is called **Photosynthesis**.

Which of the following compounds are acids, which are bases, and which are neutral when in solution?

**B** KOH **Potassium hydroxide**

**A** $H_2SO_4$ **sulfuric acid**

**N** $Pb(NO_3)_2$ **lead (ii) nitrate**

**N** NaI **sodium iodide**

**A** $HNO_3$ **nitric acid**

**B** NaOH **sodium hydroxide**

**N** $Cu_2SO_4$ **copper (i) sulfide**

**N** $H_2O$ **water**

**A** HF **Hydro fluoric acid**

**N** $AlCl_3$ **aluminum chloride**

$NH_3$ **ammonia**

**B** $NaHCO_3$ **sodium bicarbonate**

Which oxides form acids and which form bases when reacted with water?

| | | | |
|---|---|---|---|
| $Al_2O_3$ | **Base** | $CO_2$ | **Acid** |
| $SO_3$ | **Acid** | $Li_2O$ | **Base** |
| $N_2O$ | **Acid** | MgO | **Base** |

Predict the product of the following reaction and balance the equation:

$K_2O + H_2O \rightarrow$ **2 KOH** (synthesis)

Neutral solutions have a pH of **7**.

Acidic solutions have a pH of **< 7**.

Alkaline solutions have a pH of **> 7**.

Would a solution with a pH of 1 be acidic or alkaline? Weak or strong? **Strong acid**

Would a solution with a pH of 8 be acidic or alkaline? Weak or strong? **Weak base/ alkaline**

What is a neutralization reaction? **Acid + Base ➔ salt +water a type of double displacement.**

Give an example of a neutralization reaction:

**HCi + NaOH ➔ NaCi +** $\boldsymbol{H_2O}$

Give an example of a practical use of a neutralization reaction:

- **Clean up of industrial spills (acids) with basic solution**
- **Lemon juice on fish to create salty taste**