Review Questions- Chemistry

Chemical/Physical Changes:

Fill in the blanks with the following chemical changes or the definition when appropriate:

Bubbles of gas appears	(ans: Gaseous products appear as bubbles only after the mixture has been saturated with gas)
(ans: Precipitate forms)	As you mix a pair of soluble reactants in a solution, *this* will form on the bottom of the container. (Hint: “Rains down”)
A color change	(ans: Compound absorbs a characteristic set of colours, this is a chemical fingerprint for detecting presence of compound)
(ans: change in smell/taste)	*This* is not a recommended method to use while determining chemical changes
(ans: Change in volume)	When a compound is produced or a compound is consumed, *this* will change. (Hint: Density)

Name three examples of a physical change: (ans: State change, cutting, bending)

1. _____
2. _____
3. _____

What is the difference between a chemical change and a physical change? (physical change is reversible, but a chemical change is not)

_____

Nomenclature:

Name the compounds:

1. CaI_2 _____ (ans: Calcium iodide)
2. Fe_2Cl_3 _____ (ans: Iron (III) chloride, Ferric chloride)
3. SF_2 _____ (ans: Sulfur difluoride)
4. N_2O_3 _____ (ans: Dinitrogen trioxide)
5. $H_3PO_{4(aq)}$_____ (ans: Hydrogen phosphate, phosphoric acid)
6. $Pb(BrO_3)_2$ _____ (ans: Lead (II) bromate, Plumbous bromate)

Write the formula for each of the compounds:

1. Zinc fluoride _____ (ans: ZnF_2)
2. Potassium chlorate _____ (ans: $KClO_3$)
3. Magnesium nitrate _____ (ans: $Mg(NO_3)_2$)
4. Copper (II) bromide _____ (ans: $CuBr_2$)
5. Niobium (V) sulfide _____ (ans: Nb_2S_5)
6. Sodium acetate _____ (ans: $NaCH_3COO$)

Balancing equations + types of reactions:

Balance the equations and name the type of reaction:

1. __Br_3P_2 ---> __Br_2 + __P : (2,3,4 , Decomposition)
2. __H_2 + __O_2 ---> __H_2O : (2,1,2 , Synthesis)
3. __$CaCl_2$ + __Na_2O ---> __CaO + __NaCl : (1,1,1,2 , Double displacement)
4. __Mg_3N_2 + __Li_3AsO_3 ---> __$Mg_3(AsO_3)_2$ + __Li_3N : (1, 2, 1 2 , Double displacement)
5. __NaOH + __H_2SO_4 ---> __Na_2SO_4 + __H_2O : (2, 1, 1, 2 , Double displacement)
6. __CH_4 + __O_2 ---> __CO_2 + __H_2O : (1, 2, 1, 2 , Complete combustion)
7. __HCl + __KOH ---> __H_2O + __KCl : (1, 1, 1, 1 , Acid-base/neutralization)

Sig figs:

How many sig figs are in the numbers?

1. 100 _____ (ans: 1)
2. 0.00000000001 _____ (ans: 1)
3. 0.00500 _____ (ans: 3)
4. 1020 _____ (ans: 3)
5. 3.0801 _____ (ans: 5)
6. 4.300×10^7 _____ (ans: 4)

Avogadro's number:

What is avogadro's number? _____ (ans: 6.022×10^{23})

How many particles are present in:

1. 4.80 mol of Ca : (ans: 2.89×10^4)
2. 1.30 mol of Zn : (ans: 7.83×10^{23})

Calculate the number of moles:

1. 1.30g of $BeCl_2$: (ans: 0.016 mols)
2. 2.80g of Na_2Mg : (ans: 0.040 mols)

An experiment including copper (II) oxide was conducted in the lab of Chemistry High.

These were the findings:

Compound + instruments	Mass (+/- 0.01g)
Mass of crucible, cover, and copper	50.50
Mass of crucible, cover and copper (II) oxide	80.15
Mass of crucible and cover	28.00

Determine the percentage composition for the copper in the experiment: (ans: 43.14%)

Empirical formula/molecular formula:

Write the empirical formula:

1. C_4H_{12} _____ (CH_3)
2. $C_3H_{15}O_{18}$ _____ (CH_5O_6)
3. $Ca(NO_3)_2$ _____ ($Ca(NO_3)_2$)
4. Mg_4S_2 _____ (Mg_2S)

The molecular mass of a gas is 80g mol^{-1} and the empirical formula is NH_2, determine the correct molecular formula of the gas. (ans: N_5H_{10})

Stoichiometry:

Given the following equation, do the following:

1. Balance the equation

(ans: 3, 2, 1, 6)

2. Total dissociated equation

(ans: $3Mg^{+2}(aq) + 6OH^{-}(aq) + 6H^{+}(aq) + 2PO_4^{3-}(aq) \rightarrow 3Mg^{+2}(aq) + 2PO_4^{3-}(aq) + 6H_2O(l)$)

3. Net ionic equation

(ans: $OH^{-}(aq) + H^{+}(aq) \rightarrow H_2O(l)$)

4. Determine LR

(ans: $3Mg(OH)_2$)

5. Max mass of salt

(ans: 0.1577g)

6. Moles of XS remaining unused

(ans: 0.0013)

7. 0.11g of salt, % yield

(ans: 69.8%)

8. % error

(ans: 30.2%)

$$\_\_Mg(OH)_{2\ (aq)} + \_\_H_3PO_{4\ (aq)} \text{ ---> } \_\_Mg_3(PO_4)_{2\ (aq)} + \_\_H_2O_{\ (l)}$$

0.02 L	0.03 L
0.100 mol	0.200 mol

Acid and bases:

A swimming pool has a pH level of 7.4 determine:

1. The hydrogen ion concentration (ans: 3.98×10^{-8} mol L^{-1})

2. The hydroxide ion concentration (ans: 3.16×10^{-7} mol L^{-1})

3. The pOH (ans: 6.5)

Name two properties of an acid: (ans: Sour, lower pH number)

1.
2.

Name two properties of a base: (ans: Bitter, higher pH number)

1.
2.

Name the acids:

1. $HClO_4$ _____ (Perchloric acid)

2. H_2SO_4 _____ (Sulfuric acid)
3. HI _____ (Hydroiodic acid)

Name the bases:

1. KOH _____ (Potassium hydroxide)
2. $Ba(OH)_2$ _____ (Barium hydroxide)
3. LiOH _____ (Lithium hydroxide)

Solution/dilution:

1. 15.6g of MgCl2 is dissolved in 1.25L of water. Determine its concentration. (ans: 0.1310776)

2. Determine the volume of Na_2O if it has a concentration of 0.33 and weighs 13.2g. (ans: 0.645 L)

3. You dilute 160mL of a 2.3 mol/L solution of BeF_2 to 1.0L, determine the new concentration. (ans: 0.368)

Gases:

A balloon is blown up on the ground with helium at a fun fair. Once given to the child, the balloon had a temperature of 20.0 degrees celsius, a volume of 5.0 L and finally a pressure of 100 kPa. The child let go of the balloon and once it was in the air, the temperature dropped to -10.0 degrees celsius and a pressure of 30 kPa. What is the new volume of the balloon? (ans: 18.567 L)

A block of mercury (II) has a temperature of 18 degrees celsius, a volume of 300L and is 20.00 mols. What is the pressure of the block of mercury? (ans: 161.38)

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