

## Chemistry Skills You Should Have Already:

### *CHEMICAL AND PHYSICAL CHANGE (E7)*

**PART A:** Determine whether the following changes are chemical (C) or physical (P).

- \_\_\_\_\_ 1. Wax freezing
- \_\_\_\_\_ 2. Sublimation of dry ice blocks
- \_\_\_\_\_ 3. Healing of a wound
- \_\_\_\_\_ 4. Burning paper
- \_\_\_\_\_ 5. Melting butter
- \_\_\_\_\_ 6. Precipitation of silver crystals
- \_\_\_\_\_ 7. Dissolving of salt in water
- \_\_\_\_\_ 8. Rusting of iron
- \_\_\_\_\_ 9. Expansion of a metal rod held in a Bunsen burner
- \_\_\_\_\_ 10. Calcium chloride undergoing a hygroscopic reaction with water in air
- \_\_\_\_\_ 11. Formation of aluminum chloride from aluminum and cupric chloride dihydrate
- \_\_\_\_\_ 12. Solidification of para-dichlorobenzene

**PART B:** Identify the following as elements (E), compounds (C), or mixtures (M).

- \_\_\_\_\_ 1. Oxygen,  $O_2$  (g)
- \_\_\_\_\_ 2. Silver nitrate,  $AgNO_3$  (s)
- \_\_\_\_\_ 3. Wax
- \_\_\_\_\_ 4. Copper, Cu (s)
- \_\_\_\_\_ 5. Salt water,  $H_2O$  (aq)
- \_\_\_\_\_ 6. Wood
- \_\_\_\_\_ 7. Glucose,  $C_6H_{12}O_6$  (s)
- \_\_\_\_\_ 8. Rust,  $Fe_2O_3$  (s)
- \_\_\_\_\_ 9. Steel
- \_\_\_\_\_ 10. Nitrogen dioxide,  $NO_2$  (g)

**PART C:** List the 4 indicators of a chemical change.

- 1.
- 2.
- 3.
- 4.

## Chemistry Skills You Should Have Already:

### *MOLAR MASS & MOLE CONVERSIONS: (E14 & E16)*

1. Find the molar mass of these compounds:

- |   |  |
|---|--|
| a. MnO                                  | b. HgS   |
| c. MgF <sub>2</sub>                     | d. CoCl <sub>2</sub>   |
| e. La(ClO <sub>3</sub> ) <sub>3</sub>   | f. Ga <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub>                   |
| g. BaI <sub>2</sub> • 2H <sub>2</sub> O | h. Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> • 5H <sub>2</sub> O |

2. Show set-up of all calculations. Use labels and significant figures. Remember one mole can equal 3 different things concurrently: 22.4 L of gas at STP, the molar mass of a substance in grams,  $6.022 \times 10^{23}$  particles (atoms, ions, or molecules). Be careful, because some of these problems will also involve a metric system conversion, as well as a mole conversion.

a) What is the volume of 0.500 g of Xe gas at STP?

b) How many moles are in 8.96 L of N<sub>2</sub> gas at STP?

c) What is the mass of  $2.4 \times 10^{24}$  atoms of Fe?

d) How many molecules are in 3.0 grams of Al<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub>?

e) What is the volume of  $1.5 \times 10^{22}$  molecules of CO<sub>2</sub> gas at STP?

f) How many molecules are in 25.0 mg of acetic acid, HC<sub>2</sub>H<sub>3</sub>O<sub>2</sub>?

g) How many milliliters are in 1.35 moles of Cl<sub>2</sub> gas at STP?

h) What is the mass (in milligrams) of 1.49 L of H<sub>2</sub> gas at STP?

## Chemistry Skills You Should Have Already:

### BALANCING EQUATIONS: (E20)

#### Match the following terms with the correct definition:

decomposition, double replacement, single replacement, and synthesis

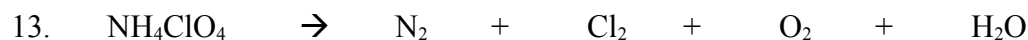
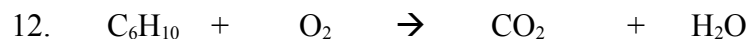
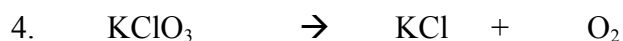
\_\_\_\_\_ A reaction that involves a single reactant breaking into 2 or more parts.

\_\_\_\_\_ A reaction that two or more parts of the reactants combine into 1 part.

\_\_\_\_\_ A reaction where 1 more reactive element replaces 1 less reactive element.

\_\_\_\_\_ A reaction where 2 elements switch places to form new products.

#### Balance the following equations using coefficients.



## Chemistry Skills You Should Have Already:

### NUCLIDE SYMBOLS: (E27)

Name	Nuclide symbol	Mass #	Atomic #	Protons	Electrons	Neutrons
Carbon (C)		13			6	
Potassium (K) <i>ion</i>		39		19	18	
Oxygen (O)	$^{17}_8\text{O}$					
Aluminum <i>ion</i> (Al)				13	10	14
Chromium (Cr)		52			24	
Phosphide (P) <i>ion</i>	$^{31}_{15}\text{P}^{-3}$					
Silver (Ag)			47			61
Iodide <i>ion</i> (I)		127		53	54	
Barium (Ba)			56			81
Zirconium (Zr)	$^{91}_{40}\text{Zr}$					
Mercury (II) <i>ion</i>		201	80		78	
Tin (II) <i>ion</i>			50		48	68
Xenon (Xe)		131	54			
Arsenide (As) <i>ion</i>				33	36	42

*NAMES OF IONS (E28)* – You need to know all of the ions on the Oxidation number chart I handed out. These include all of the ones you learned in Chemistry 1, but also about 12 more. You might still have your flashcards from that test...

## Chemistry Skills You Should Have Already:

### NAMING/FORMULA WRITING FOR INORGANIC COMPOUNDS (E-29)

**PART A: Ionic Compounds & hydrated ionic compounds** Ex: calcium chloride =  $\text{CaCl}_2$   
(Final answers should NOT have charges on ions; there are no prefixes either)

**Write the correct formula.**

1. zinc fluoride
2. iron (III) acetate
3. calcium phosphate
4. manganese (II) sulfide
5. ammonium sulfite
6. strontium nitrate
7. chromium (III) oxide
8. lead (II) hydroxide
9. calcium bicarbonate
10. silver (I) chlorate
11. chromium (III) chloride trihydrate
12. nickel (II) nitrate heptahydrate

**Name the following compounds.**

1.  $\text{AgNO}_3$
2.  $\text{SrF}_2$
3.  $\text{NiBr}_2$
4.  $\text{Cu}_2\text{O}$
5.  $\text{MnCl}_2$
6.  $\text{Zn}(\text{OH})_2$
7.  $\text{KI}$
8.  $\text{SnCrO}_4$
9.  $\text{Ni}(\text{ClO}_3)_2$
10.  $\text{Ba}(\text{C}_2\text{H}_3\text{O}_2)_2$
11.  $\text{CuCl}_2 \cdot 2 \text{H}_2\text{O}$
12.  $\text{Fe}(\text{NO}_3)_3 \cdot 6 \text{H}_2\text{O}$

**PART B: Molecules** Ex: diphosphorus pentoxide =  $\text{P}_2\text{O}_5$  (There ARE prefixes used here.)

1. carbon dioxide
2. dinitrogen monoxide
3. tetranitrogen decasulfide
4. xenon trioxide
5. sulfur hexafluoride

1.  $\text{N}_2\text{O}_5$
2.  $\text{SiCl}_5$
3.  $\text{NF}_3$
4.  $\text{P}_4\text{S}_6$
5.  $\text{NO}$

**PART C: Acids** Remember there are 2 kinds of acids – binary and oxyacids

1. hydroiodic acid
2. nitrous acid
3. sulfuric acid
4. carbonous acid
5. hydrosulfuric acid

1.  $\text{H}_2\text{CO}_3$
2.  $\text{HBr}$
3.  $\text{HF}$
4.  $\text{H}_2\text{SO}_3$
5.  $\text{HNO}_3$