Name: Solutions Date: _____

Chemical Reactions Practice Test

I CAN...

- Label the atoms and draw Lewis diagrams
- Get information from the periodic table
- Determine charges and names of ions, and write in ionic notation
- Identify, name and write formulas for ionic compounds, including multivalent and polyatomic ions
- Identify, name and write formulas for covalent compounds
- Explain the difference between ionic and covalent compounds
- Write word and skeleton equations, including states
- Explain the law of conservation of mass
- Balance chemical equations
- Match acid formulas with their names
- Differentiate between acids and bases using their physical and chemical properties
- Determine if something is acidic, basic or neutral using pH or hydrogen ion concentration
- Predict the products of neutralization reaction (NOT carbonate bases)
- Explain ways to make a reaction rate increase or decrease
- Define exothermic and endothermic

1. Fill in this chart:

	Chlorine	Magnesium	Nitrogen
Class of Element (metal, non-metal, semi-metal)	non-metal	metal	non-metal
Atomic Number	17	12	7
Atomic Mass	35.45amu	24.31amu	14.01 amu
Lewis Diagram			
Ionic Notation	Cl^-	Mg^{2+}	N^{3-}
Ion Name	chloride ion	magnesium ion	nitride ion

2. Write the formulas for these compounds:
   a. sodium chloride NaCl
   b. tetraphosphorus decoxide P_4O_{10}
   c. ammonium sulfate $(NH_4)_2SO_4$
   d. potassium nitrate KNO_3
   e. calcium hydroxide $Ca(OH)_2$
   f. dinitrogen trioxide N_2O_3
   g. lead(II) phosphate $Pb_3(PO_4)_2$
   h. sulfur trioxide SO_3

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3. Name the following compounds:
   a. CO_2 carbon dioxide
   b. $ZnCl_2$ zinc chloride
   c. BF_3 boron trifluoride
   d. FeO iron(II) oxide
   e. $SnSO_4$ tin(II) sulfate
   f. $AgNO_3$ silver nitrate
   g. ICl iodine monochloride
   h. $KClO_3$ potassium chlorate

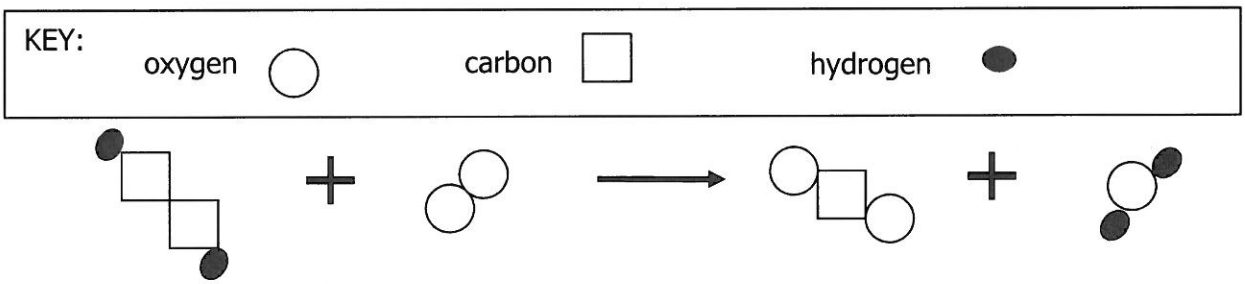
4. How are ionic and covalent compounds different...
   a. In how they form? ionic - e^- are transferred; covalent - e^- are shared
   b. In what they contain? ionic has a metal and a non-metal, covalent is only non-metals
   c. In how they are named? covalent has prefixes

5. Use the equation below to answer the questions.

$$2\ Na\ (s) + 2\ H_2O\ (l) \rightarrow \boxed{2\ NaOH\ (aq) + H_2\ (g)}$$

   a. Circle the compound that does not have a coefficient.
   b. Draw a triangle around the subscript in water.
   c. Draw a rectangle around the products.
   d. Put a star above the compound that is dissolved in water.

6. Below is a representation of a chemical reaction.



   a. Write a word equation for this reaction.
   dicarbon dihydride + oxygen → carbon dioxide + water
   b. Write a skeleton equation for this reaction.
   $C_2H_2 + O_2 \rightarrow CO_2 + H_2O$
   c. The way this reaction is drawn above, it does not follow the law of conservation of mass. Explain why not, then write the reaction so that mass is conserved.
   there are not the same number of atoms of each type in the products and reactants (mass(reactants) ≠ mass(products))
   $2\ C_2H_2 + 5\ O_2 \rightarrow 4\ CO_2 + 2\ H_2O$

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7. A clear liquid has spilled on the lab bench, and you are not sure if it is an acid, a base or something else. You test it and find the following:
   - It turns blue litmus red, and has no effect on red litmus.
   - It has a sour smell.

   a. Identify whether the liquid is an acid, a base or something else and how you know.

   acid - turns litmus red and smells sour (bases turn litmus blue and water would have no effect on either colour)

   b. What would you do to clean up this spill? Be specific!!

   PPE, add baking soda, retest pH until it is neutral, sweep up solid, clean counter with water & paper towel

8. Solution A has a pH of 12.5. Solution B has a pH of 3.2.

   a. Which solution is sulfuric acid? Which is sodium hydroxide?

   B A

   b. Circle the formula that represents sulfuric acid:

   H_2S H_2SO_3 H_2SO_4

   c. If these solutions are mixed together, write the balanced chemical reaction for the neutralization reaction.

   $2\,NaOH + H_2SO_4 \rightarrow 2\,H_2O + Na_2SO_4$

   d. When the solutions are mixed together, the products feel warm. Is this an exothermic or endothermic reaction?

   exothermic

9. You are reacting solid magnesium (Mg) with hydrochloric acid in the lab. Explain **two** ways you can make this reaction occur at a faster rate.

   ① increase temperature of acid - particles have more energy and will collide more

   ② use powdered magnesium - increase surface area - more access to all reactant particles

   ③ increase concentration of acid - more reactants means more collisions