

**Unit 7 Review**  
**Honors Chemistry**

**Name** \_\_\_\_\_  
**Date** \_\_\_\_\_ **Block** \_\_\_\_\_

- 1) Mixtures can be separated into simpler substances with a \_\_\_\_\_ change, and compounds can be separated into their elements with a \_\_\_\_\_ change.
- a. physical, physical
  - b. physical, chemical
  - c. chemical, physical
  - d. chemical, chemical
- 2) All chemical changes involve the formation of
- a. a gas
  - b. heat
  - c. a new substance
  - d. a color change
- 3) Which of the following is classified as a physical change?
- a. decomposing sugar into carbon and water
  - b. forming sodium chloride from sodium and chlorine
  - c. distilling saltwater into salt and water
  - d. rusting of iron to form iron oxide
- 4) Which process represents a chemical change?
- a. melting of ice
  - b. corrosion of copper
  - c. evaporation of water
  - d. crystallization of sugar
- 5) When dry ice (solid carbon dioxide) undergoes sublimation, this would be classified as
- a. a physical change, because the chemical identity of the CO<sub>2</sub> is unchanged
  - b. a physical change, because carbon dioxide is being separated into carbon and oxygen
  - c. a chemical change, because a gas is being produced
  - d. a chemical change, because carbon dioxide is being decomposed
- 6) Which of the following processes would be classified as a physical change?
- a.  $\text{Zn}(s) + \text{CuSO}_4(aq) \rightarrow \text{Cu}(s) + \text{ZnSO}_4(aq)$
  - b.  $\text{CaCO}_3(s) \rightarrow \text{CaO}(s) + \text{CO}_2(g)$
  - c.  $\text{NH}_3(g) + \text{HCl}(g) \rightarrow \text{NH}_4\text{Cl}(s)$
  - d.  $\text{C}_{12}\text{H}_{26}\text{O}(s) \rightarrow \text{C}_{12}\text{H}_{26}\text{O}(l)$
- 7) Which statement describes a chemical change?
- a. Alcohol evaporates.
  - b. Water vapor forms snowflakes.
  - c. Table salt (NaCl) is crushed into powder.
  - d. Glucose (C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>) and oxygen produce CO<sub>2</sub> and H<sub>2</sub>O
- 8) Given the incomplete equation:  $4\text{Fe} + 3\text{O}_2 \rightarrow 2\text{X}$   
Which compound is represented by X?
- a. FeO
  - b. Fe<sub>2</sub>O<sub>3</sub>
  - c. Fe<sub>3</sub>O<sub>2</sub>
  - d. Fe<sub>3</sub>O<sub>4</sub>

9) Given the balanced equation representing a reaction:  $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$

What is the mass of  $\text{H}_2\text{O}$  produced when 10.0 grams of  $\text{H}_2$  reacts completely with 80.0 grams of  $\text{O}_2$ ?

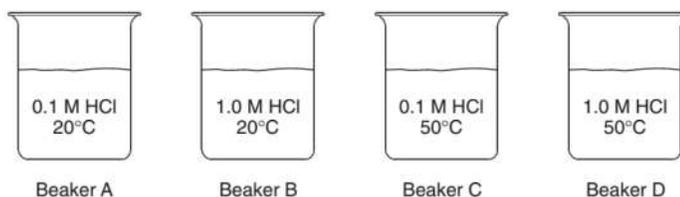
- a. 70.0 g
- b. 90.0 g
- c. 180 g
- d. 800 g

10) Given the reaction:  $\text{Zn(s)} + 2\text{HCl(aq)} \rightarrow \text{ZnCl}_2\text{(aq)} + \text{H}_2\text{(g)}$

The reaction occurs more slowly when a single piece of zinc is used than when the same mass of powdered zinc is used. Why does this occur?

- a. The powdered zinc is more concentrated
- b. The powdered zinc has greater surface area
- c. The powder zinc requires less activation energy
- d. The powdered zinc generates more heat energy

11) In each of the four beakers shown below, a 2.0-centimeter strip of magnesium ribbon reacts with 100 milliliters of  $\text{HCl(aq)}$  under the conditions shown. In which beaker will the reaction occur at the fastest rate?



12) Which of the following is NOT a true statement about all chemical reactions?

- a. They are the ways in which atoms are joined together and rearranged.
- b. They are the ways in which new atoms are formed.
- c. The starting materials are products
- d. The bonds of the reactants are broken and the bonds of the products are formed.

13) Which of the following is a balanced equation?

- a.  $\text{C}_3\text{H}_8 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
- b.  $\text{C}_3\text{H}_8 + \text{O}_2 \rightarrow 3\text{CO}_2 + \text{H}_2\text{O}$
- c.  $\text{C}_3\text{H}_8 + 2\text{O}_2 \rightarrow 3\text{CO}_2 + 4\text{H}_2\text{O}$
- d.  $\text{C}_3\text{H}_8 + 5\text{O}_2 \rightarrow 3\text{CO}_2 + 4\text{H}_2\text{O}$

14) Which of the following reactions is an example of a single-replacement reaction?

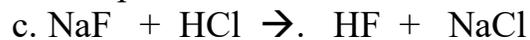
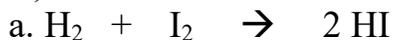
- a.  $2\text{AgNO}_3 + \text{Cu} \rightarrow \text{Cu(NO}_3)_2 + 2\text{Ag}$
- b.  $\text{KOH} + \text{HNO}_3 \rightarrow \text{KNO}_3 + \text{H}_2\text{O}$
- c.  $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$
- d.  $4\text{Fe(OH)}_2 + 2\text{H}_2\text{O}_2 \rightarrow 4\text{Fe(OH)}_3$

15)  $\text{A(s)} + \text{B(s)} \rightarrow \text{AB(g)} + \text{heat}$

This reaction is an example of

- a. an endothermic reaction
- b. an exothermic reaction
- c. a decomposition reaction
- d. a double replacement reaction

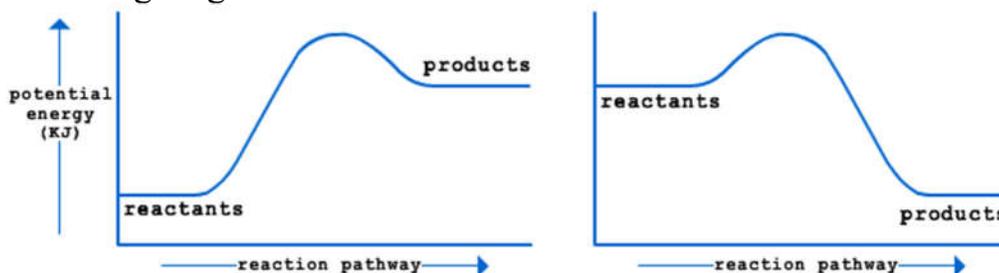
16) Which of these reactions shows simple chemical decomposition?



17) When  $Fe_3O_4 + Al \rightarrow Al_2O_3 + Fe$  is correctly balanced, what is the coefficient of Fe?

- a. 3
- b. 4
- c. 6
- d. 9

18) Label the following diagrams as either an exothermic or endothermic reaction.



19) What is the difference between endothermic and exothermic change? Give examples of each.

20) Identify the TYPE of reaction that is represented in each diagram. Use the following choices:

synthesis = S

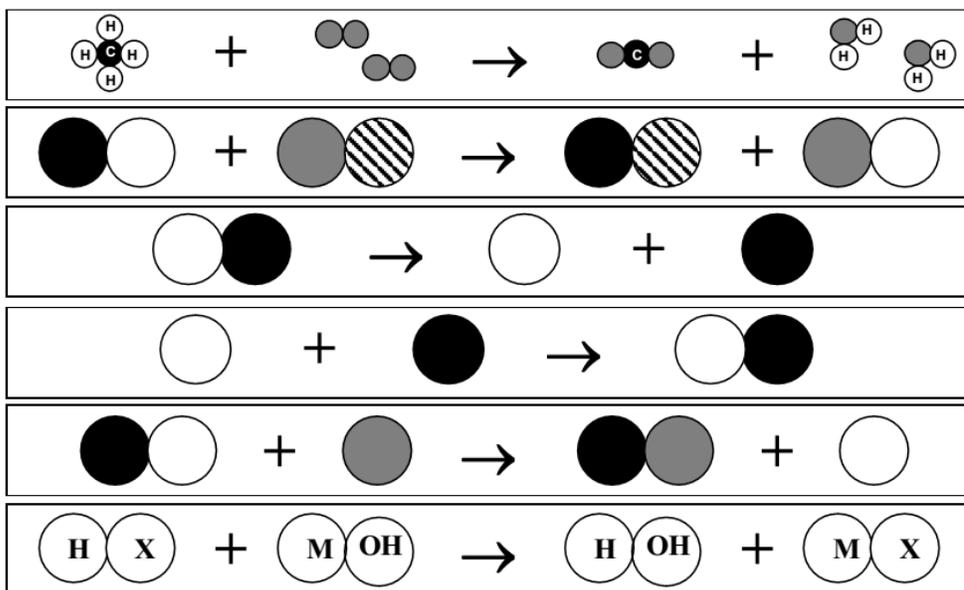
single replacement = SR

combustion = C

decomposition = D

double replacement = DR

neutralization = N



21) Write the balanced equation from the sentence and identify the type of reaction.

synthesis = S

single replacement = SR

combustion = C

decomposition = D

double replacement = DR

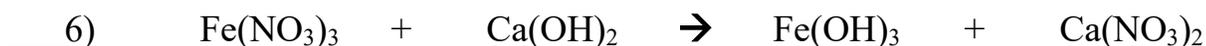
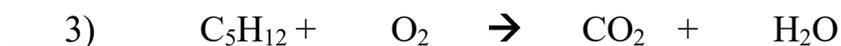
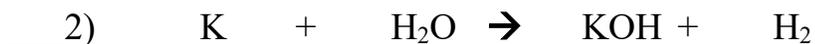
neutralization = N

\_\_\_\_\_ a. Solid Nickel (III) Hydroxide,  $\text{Ni}(\text{OH})_3$ , was broken down to Nickel (III) oxide powder ( $\text{Ni}_2\text{O}_3$ ) and water. The temperature of the flask where the reaction took place changed from  $25^\circ\text{C}$  to  $35^\circ\text{C}$

\_\_\_\_\_ b. Chlorine gas ( $\text{Cl}_2$ ) and aqueous Scandium Bromide ( $\text{ScBr}_2$ ) reacted to form Bromine gas ( $\text{Br}_2$ ) and aqueous Scandium Chloride ( $\text{ScCl}_2$ ) in an exothermic reaction.

\_\_\_\_\_ c. Aqueous Sulfuric Acid ( $\text{H}_2\text{SO}_4$ ) reacted with aqueous sodium hydroxide ( $\text{NaOH}$ ) to produce aqueous Sodium Sulfate ( $\text{Na}_2\text{SO}_4$ ) and water in an exothermic reaction.

22) Balance and identify the following reactions



23) The number of grams of oxygen required for the complete combustion of 4.00g of methane(CH<sub>4</sub>) is



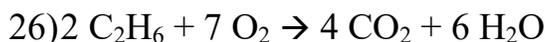
- a. 4.00g
- b. 8.00g
- c. 16.0g
- d. 32.0g

24) When magnesium metal is burned, it forms MgO. How many moles of oxygen gas are needed to burn 10 moles of Mg?

- a. 2 moles
- b. 5 moles
- c. 10 moles
- d. 20 moles

25) The reaction of iron (III) oxide reacts with carbon to produce iron metal and carbon dioxide. What is the % yield of iron if the theoretical yield is 5.90g and the actual yield is 5.20g?

- a. 56.3%
- b. 113%
- c. 89.9%
- d. 88.1%



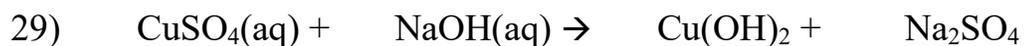
To produce 12.0g of water, how many moles of oxygen gas are needed?

- a. 1.45 mol O<sub>2</sub>
- b. 0.777 mol O<sub>2</sub>
- c. 0.571 mol O<sub>2</sub>
- d. 0.424 mol O<sub>2</sub>

27) A chemical engineer for a fertilizer company is determining the most efficient way to produce ammonia. The engineer carries out the Haber reaction under four different conditions. According to the data below, which procedure gave the greatest percent yield?

Procedure	Initial Volume (m <sup>3</sup> )		Final Volume (m <sup>3</sup> )		
	N <sub>2</sub>	H <sub>2</sub>	N <sub>2</sub>	H <sub>2</sub>	NH <sub>3</sub>
A	1000	3000	600	1800	800
B	1000	3000	250	750	1500
C	1000	3000	450	1350	1100
D	1000	3000	375	1125	1250

28) Sodium hydroxide pellets were dissolved in water. If it takes 32.50mL of 0.2003M HCl to neutralize the sodium hydroxide, what was the mass of sodium hydroxide used? (Write the balanced equation first)



100 mL of a 1.25M solution of Copper (II) Sulfate was reacted with excess amounts sodium hydroxide. How much copper (II) hydroxide is expected to form?

30) Consider the following reaction:



Assuming we start with 100 grams of calcium carbonate and 45.0 grams of iron (III) phosphate.

a. Determine the theoretical yield of calcium phosphate

b. Identify the limiting and excess reactant

31) 3.25 g of iron (III) oxide are treated in a blast furnace with 1.50 g of carbon monoxide to form 1.30 g of pure iron.  $[\underline{\hspace{1cm}} \text{Fe}_2\text{O}_3 + \underline{\hspace{1cm}} \text{CO} \rightarrow \underline{\hspace{1cm}} \text{Fe} + \underline{\hspace{1cm}} \text{CO}_2]$ .

a. Determine the theoretical yield of iron

b. Identify the limiting and excess reactant

c. Calculate the percent yield of iron