

Name: _____ Date: _____ Period: _____

Ch 11 assessment review

Matching

Match each item with the correct statement below.

- a. product
- b. reactant
- c. chemical equation
- d. balanced equation
- e. skeleton equation

- _____ 1. a chemical equation that does not indicate relative amounts of reactants and products
- _____ 2. a new substance formed in a chemical reaction
- _____ 3. a starting substance in a chemical reaction
- _____ 4. a concise representation of a chemical reaction
- _____ 5. an equation in which each side has the same number of atoms of each element

Match each item with the correct statement below.

- a. activity series of metals
- b. single-replacement reaction
- c. combustion reaction
- d. decomposition reaction

- _____ 6. a reaction in which a single compound is broken down into simpler substances
- _____ 7. a reaction in which oxygen reacts with another substance, often producing heat or light
- _____ 8. a reaction in which the atoms of one element replace the atoms of a second element in a compound
- _____ 9. a list of metals in order of decreasing reactivity

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- _____ 10. Chemical reactions _____.
 - a. occur only in living organisms
 - b. create and destroy atoms
 - c. only occur outside living organisms
 - d. produce new substances
- _____ 11. Everyday equations describe _____.
 - a. thermonuclear reactions
 - b. everyday processes
 - c. chemical reactions
 - d. biological chemistry
- _____ 12. What does the symbol Δ in a chemical equation mean?
 - a. Heat is supplied to the reaction.
 - b. A catalyst is needed.
 - c. yields
 - d. precipitate
- _____ 13. Chemical equations _____.
 - a. describe chemical reactions
 - b. show how to write chemical formulas
 - c. give directions for naming chemical compounds
 - d. describe only biological changes
- _____ 14. A skeleton equation does NOT show which of the following?
 - a. the correct formulas of the reactants and products
 - b. the reactants on the left, the products on the right
 - c. an arrow connecting the reactants to the products
 - d. the relative amounts of reactants and products
- _____ 15. Symbols used in equations, together with the explanations of the symbols, are shown below. Which set is correct?
 - a. (g), grams
 - b. (l), liters
 - c. (aq), dissolved in water
 - d. (s), solid product
- _____ 16. In the chemical equation $\text{H}_2\text{O}_2(\text{aq}) \rightarrow \text{H}_2\text{O}(\text{l}) + \text{O}_2(\text{g})$, the O_2 is a _____.
 - a. catalyst
 - b. solid
 - c. product
 - d. reactant
- _____ 17. This symbol (\rightleftharpoons) indicates that _____.
 - a. heat must be applied
 - b. a gas is formed by the reaction
 - c. an incomplete combustion reaction has occurred
 - d. the reaction is reversible
- _____ 18. A catalyst is _____.
 - a. the product of a combustion reaction
 - b. not used up in a reaction
 - c. one of the reactants in single-replacement reactions
 - d. a solid product of a reaction

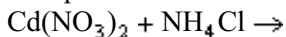
- ___ 32. The product of a combination reaction is $\text{Ba}(\text{OH})_2$. If one of the reactants is H_2O , what is the other reactant?
- Ba_2O
 - BaO
 - BaH
 - BaO_2
- ___ 33. In order to predict whether or not a single-replacement reaction takes place, you need to consult a chart that shows the ____.
- periodic table
 - activity series of metals
 - common polyatomic ions
 - ionic charges of representative elements.
- ___ 34. In order for the reaction $2\text{Al} + 6\text{HCl} \rightarrow 2\text{AlCl}_3 + 3\text{H}_2$ to occur, which of the following must be true?
- Al must be above Cl on the activity series.
 - Al must be above H on the activity series.
 - Heat must be supplied for the reaction.
 - A precipitate must be formed.
- ___ 35. In a combustion reaction, one of the reactants is ____.
- hydrogen
 - nitrogen
 - oxygen
 - a metal
- ___ 36. The products of a combustion reaction do NOT include ____.
- water
 - carbon dioxide
 - carbon monoxide
 - hydrogen
- ___ 37. The type of reaction that takes place when one element reacts with a compound to form a new compound and a different element is a ____.
- combination reaction
 - decomposition reaction
 - single-replacement reaction
 - double-replacement reaction
- ___ 38. In a double-replacement reaction, the ____.
- products are always molecular
 - reactants are two ionic compounds
 - reactants are two elements
 - products are a new element and a new compound
- ___ 39. Which of the following statements is NOT correct?
- The only way to determine the products of a reaction is to carry out the reaction.
 - All chemical reactions can be classified as one of five general types.
 - Complete combustion has occurred when all the carbon in the product is in the form of carbon dioxide.
 - A single reactant is the identifying characteristic of a decomposition reaction.
- ___ 40. Which of the following is a balanced equation representing the decomposition of lead(IV) oxide?
- $\text{PbO}_2 \rightarrow \text{Pb} + 2\text{O}$
 - $\text{PbO}_2 \rightarrow \text{Pb} + \text{O}_2$
 - $\text{Pb}_2\text{O} \rightarrow 2\text{Pb} + \text{O}$
 - $\text{PbO} \rightarrow \text{Pb} + \text{O}_2$
- ___ 41. What are the correct formulas and coefficients for the products of the following double-replacement reaction?
 $\text{RbOH} + \text{H}_3\text{PO}_4 \rightarrow$
- $\text{Rb}(\text{PO}_4)_3 + \text{H}_2\text{O}$
 - $\text{RbPO}_4 + 2\text{H}_2\text{O}$
 - $\text{Rb}_3\text{PO}_4 + 3\text{H}_2\text{O}$
 - $\text{H}_3\text{Rb} + \text{PO}_4\text{OH}$
- ___ 42. When the equation for the complete combustion of one mole of $\text{C}_3\text{H}_7\text{OH}$ is balanced, the coefficient for oxygen is _____. **SHOW YOUR WORK**
- ___ 43. Which of the following statements is NOT true about the decomposition of a simple binary compound?
- The products are unpredictable.
 - The products are the constituent elements.
 - The reactant is a single substance.
 - The reactant could be an ionic or a molecular compound.
- ___ 44. Which of the following statements is true about single-replacement reactions?
- They are restricted to metals.
 - They involve a single product.
 - Two reactants produce two products.
 - Any metal replaces any other metal.

- ___ 45. In the activity series of metals, which metal(s) will displace hydrogen from an acid?
- only metals above hydrogen
 - only metals below hydrogen
 - any metal
 - only metals from Li to Na
- ___ 46. Use the activity series of metals to complete a balanced chemical equation for the following single replacement reaction.
 $\text{Ag}(s) + \text{KNO}_3(aq) \rightarrow$
- $\text{AgNO}_3 + \text{K}$
 - $\text{AgK} + \text{NO}_3$
 - AgKNO_3
 - No reaction takes place because silver is less reactive than potassium.
- ___ 47. Which of the following statements is NOT true about double-replacement reactions?
- The product may precipitate from solution.
 - The product may be a gas.
 - The product may be a molecular compound.
 - The reactant may be a solid metal.
- ___ 48. In a double-replacement reaction, ____.
- the reactants are usually a metal and a nonmetal
 - one of the reactants is often water
 - the reactants are generally two ionic compounds in aqueous solution
 - energy in the form of heat or light is often produced
- ___ 49. A double-replacement reaction takes place when aqueous Na_2CO_3 reacts with aqueous $\text{Sn}(\text{NO}_3)_2$. You would expect one of the products of this reaction to be ____.
- NaNO_3
 - NaSn
 - $\text{Sn}(\text{CO}_3)_2$
 - CNO_3
- ___ 50. The complete combustion of which of the following substances produces carbon dioxide and water?
- C_8H_{18}
 - K_2CO_3
 - CaHCO_3
 - NO
- ___ 51. The reaction $2\text{Fe} + 3\text{Cl}_2 \rightarrow 2\text{FeCl}_3$ is an example of which type of reaction?
- combustion reaction
 - single-replacement reaction
 - combination reaction
 - decomposition reaction
- ___ 52. The equation $\text{Mg}(s) + 2\text{HCl}(aq) \rightarrow \text{MgCl}_2(aq) + \text{H}_2(g)$ is an example of which type of reaction?
- combination reaction
 - single-replacement reaction
 - decomposition reaction
 - double-replacement reaction
- ___ 53. The equation $\text{H}_3\text{PO}_4 + 3\text{KOH} \rightarrow \text{K}_3\text{PO}_3 + 3\text{H}_2\text{O}$ is an example of which type of reaction?
- double-replacement reaction
 - combination reaction
 - decomposition reaction
 - single-replacement reaction
- ___ 54. The equation $2\text{C}_3\text{H}_7\text{OH} + 9\text{O}_2 \rightarrow 6\text{CO}_2 + 8\text{H}_2\text{O}$ is an example of which type of reaction?
- combustion reaction
 - single-replacement reaction
 - double-replacement reaction
 - decomposition reaction
- ___ 55. A double-replacement reaction takes place when aqueous cobalt(III) chloride reacts with aqueous lithium hydroxide. One of the products of this reaction is ____.
- $\text{Co}(\text{OH})_3$
 - $\text{Co}(\text{OH})_2$
 - LiCo_3
 - LiCl_3
- ___ 56. If a combination reaction takes place between rubidium and bromine, the chemical formula for the product is ____.
- RuBr
 - Rb_2Br
 - RbBr_2
 - RbBr

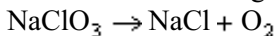
- _____ 57. What is the balanced chemical equation for the reaction that takes place between bromine and sodium iodide?
- a. $\text{Br}_2 + \text{NaI} \rightarrow \text{NaBr}_2 + \text{I}$ c. $\text{Br} + \text{NaI}_2 \rightarrow \text{NaBrI}_2$
b. $\text{Br}_2 + 2\text{NaI} \rightarrow 2\text{NaBr} + \text{I}_2$ d. $\text{Br} + \text{NaI}_2 \rightarrow \text{NaBr} + \text{I}_2$

Short Answer

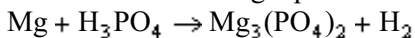
58. Complete and balance the following equation.



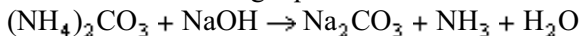
59. Balance the following equation.



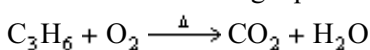
60. Balance the following equation.



61. Balance the following equation.



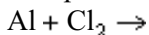
62. Balance the following equation.



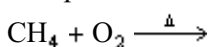
63. Balance the following equation.



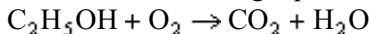
64. Complete and balance the following equation.



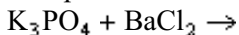
65. Complete and balance the following equation.



66. Balance the following equation.



67. Complete and balance the following equation:



68. Write the balanced molecular, ionic, and net ionic equations for the following reaction:

Aqueous barium chlorate reacts with aqueous sodium sulfate to form a barium sulfate precipitate and aqueous sodium chlorate:

a. molecular equation:

b. complete ionic equation:

c. net ionic equation:

69. Write the balanced molecular, ionic, and net ionic equations for the following reaction, you MUST include the state of matter for each compound:

Aqueous phosphoric acid reacts with aqueous calcium hydroxide to form a aqueous calcium phosphate and molecular water:

a. Balanced molecular equation:

b. complete ionic equation:

c. net ionic equation:

70. Write the balanced molecular, ionic, and net ionic equations for the following reaction, you MUST include the state of matter for each compound: Predict the precipitate that forms when aqueous solutions of silver nitrate and potassium chloride react to form products in a double-replacement reaction.
- Balanced Molecular equation
 - complete ionic equation
 - net ionic equation

Solubility Rules for Ionic Compounds

Compound	Solubility
Salts of alkali metals and ammonia	Soluble
Nitrate salts and chlorate salts	Soluble
Sulfate salts, except compounds with Pb^{2+} , Ag^{1+} , Hg_2^{2+} , Ba^{2+} , Sr^{2+} , and Ca^{2+}	Soluble Exceptions= insoluble
Chloride salts, except compound with Pb^{2+} , Ag^{1+} , and Hg_2^{2+}	Soluble
Carbonates, phosphates, chromates, sulfides, and hydroxides	Most are insoluble

Activity Series of Metals	
Name	Symbol
Lithium	Li
Potassium	K
Calcium	Ca
Sodium	Na
Magnesium	Mg
Aluminum	Al
Zinc	Zn
Iron	Fe
Lead	Pb
(Hydrogen)	(H)*
Copper	Cu
Mercury	Hg
Silver	Ag

Decreasing reactivity →

*Metals from Li to Na will replace H from acids and water; from Mg to Pb they will replace H from acids only.