

Chapter 6 Homework

Class: _____ Number: _____ Name: _____

- _____ 1. Which of the following is a characteristic that describes **nonmetals**?
a. shiny b. ductile c. good conductor
d. their solids shatter when hammered e. form cations
- _____ 2. Which of the following is an **alkali metal**?
a. H b. Cs c. Fe d. He e. Sr
- _____ 3. Which one of the following ionic hydroxides is a **soluble base**?
a. $\text{Cu}(\text{OH})_2$ b. $\text{Fe}(\text{OH})_2$ c. $\text{Fe}(\text{OH})_3$
d. $\text{Sr}(\text{OH})_2$ e. $\text{Al}(\text{OH})_3$
- _____ 4. Which of the following is an **ionization**?
a. $\text{HCl}(\text{aq}) + \text{NaOH}(\text{aq}) \rightarrow \text{NaCl}(\text{aq}) + \text{H}_2\text{O}(\ell)$
b. $\text{AgNO}_3(\text{aq}) + \text{LiCl}(\text{aq}) \rightarrow \text{AgCl}(\text{s}) + \text{LiNO}_3(\text{aq})$
c. $\text{HBr}(\text{g}) \rightarrow \text{H}^+(\text{aq}) + \text{Br}^-(\text{aq})$
d. $2 \text{H}_2\text{O}(\ell) \rightarrow 2 \text{H}_2(\text{g}) + \text{O}_2(\text{g})$
e. $\text{P}_4(\text{s}) + 6 \text{Cl}_2(\text{g}) \rightarrow 4 \text{PCl}_3(\ell)$
- _____ 5. Which one of the following compounds is **incorrectly** identified as to type of compound?

<u>Substance</u>	<u>Type of Compound</u>
a. RbOH	strong base
b. HClO_3	strong acid
c. H_2S	weak acid
d. $\text{Ca}(\text{OH})_2$	insoluble base
e. H_3PO_2	weak acid
- _____ 6. Which one of the following compounds is **not** a strong electrolyte?
a. RbF b. $\text{Ni}(\text{ClO}_3)_2$ c. $\text{Mg}(\text{NO}_3)_2$
d. HF e. HNO_3
- _____ 7. What is the **net ionic** equation for the following formula unit equation?
 $\text{Cu}(\text{NO}_3)_2(\text{aq}) + \text{H}_2\text{S}(\text{aq}) \rightarrow \text{CuS}(\text{s}) + 2\text{HNO}_3(\text{aq})$
a. $\text{Cu}^{2+}(\text{aq}) + \text{H}_2\text{S}(\text{aq}) \rightarrow \text{CuS}(\text{s}) + 2\text{H}^+(\text{aq})$
b. $[\text{Cu}^{2+}(\text{aq}) + 2\text{NO}_3^-(\text{aq})] + \text{H}_2\text{S}(\text{aq}) \rightarrow \text{CuS}(\text{s}) + 2[\text{H}^+(\text{aq}) + \text{NO}_3^-(\text{aq})]$
c. $\text{Cu}^{2+}(\text{aq}) + 2\text{H}^+(\text{aq}) + \text{S}^{2-}(\text{aq}) \rightarrow \text{CuS}(\text{s}) + 2\text{H}^+(\text{aq})$
d. $\text{Cu}^{2+}(\text{aq}) + \text{S}^{2-}(\text{aq}) \rightarrow \text{CuS}(\text{s})$
e. $\text{Cu}^{2+}(\text{aq}) + 2\text{NO}_3^-(\text{aq}) + 2\text{H}^+(\text{aq}) + \text{S}^{2-}(\text{aq}) \rightarrow \text{CuS}(\text{s}) + 2\text{H}^+(\text{aq}) + 2\text{NO}_3^-(\text{aq})$
- _____ 8. Determine the **oxidation number** of the underlined element in $\underline{\text{Br}}\text{F}_5$.
a. +7 b. +5 c. +3 d. +1 e. -1
- _____ 9. What are the oxidation numbers (oxidation states) of the elements in HCO_3^- ?
a. H = +1, C = +5, O = -2 b. H = +1, C = +3, O = -2
c. H = +1, C = +2, O = -2 d. H = +2, C = +2, O = -2
e. H = +1, C = +4, O = -2
- _____ 10. What is the correct name for NaClO ?
a. sodium hypochlorite b. sodium chlorite c. sodium chloride
d. sodium chlorate e. sodium perchlorate
- _____ 11. Which of the following matched pairs of name and formula **has an error**?

<u>Formula</u>	<u>Name</u>
a. LiClO_2	lithium chlorite
b. HIO_3	periodic acid
c. HClO_2	chlorous acid
d. HBrO	hypobromous acid
e. $\text{Sr}(\text{ClO}_4)_2$	strontium perchlorate

- _____ 12. Which of the following matched pairs of name and formula **has an error**?
- | <u>Formula</u> | <u>Name</u> |
|------------------------------------|------------------------------|
| a. HIO | hypoiodous acid |
| b. NaHSO ₄ | sodium hydrogen sulfate |
| c. HNO ₃ | nitric acid |
| d. H ₄ SiO ₄ | silicic acid |
| e. KH ₂ PO ₄ | potassium hydrogen phosphate |
- _____ 13. In the following reaction oxygen is _____.
- $$2\text{C}_4\text{H}_{10}(\text{g}) + 13\text{O}_2(\text{g}) \rightarrow 8\text{CO}_2(\text{g}) + 10\text{H}_2\text{O}(\ell)$$
- the oxidizing agent and is oxidized.
 - the oxidizing agent and is reduced.
 - the reducing agent and is oxidized.
 - the reducing agent and is reduced.
 - neither an oxidizing agent nor a reducing agent.
- _____ 14. Which of the following statements about a decomposition reaction is **not** true?
- It may or may not also be an oxidation-reduction reaction.
 - It may produce two elements as products.
 - It may also be a combination reaction.
 - It may produce an element and a compound as products.
 - It may produce two different compounds as products.
- _____ 15. Which of the following reactions is a decomposition reaction?
- $2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{H}_2\text{O}(\ell)$
 - $\text{Fe}_2\text{O}_3(\text{s}) + 3\text{CO}(\text{g}) \rightarrow 2\text{Fe}(\text{s}) + 3\text{CO}_2(\text{g})$
 - $\text{C}_3\text{H}_8(\text{g}) + 5\text{O}_2(\text{g}) \rightarrow 3\text{CO}_2(\text{g}) + 4\text{H}_2\text{O}(\ell)$
 - $2\text{AgNO}_3(\text{aq}) + \text{Zn}(\text{s}) \rightarrow 2\text{Ag}(\text{s}) + \text{Zn}(\text{NO}_3)_2(\text{aq})$
 - $2\text{KClO}_3(\text{s}) \rightarrow 2\text{KCl}(\text{s}) + 3\text{O}_2(\text{g})$
- _____ 16. Which of the following is **both** a decomposition reaction and a reduction-oxidation reaction?
- $\text{H}_2\text{CO}_3(\text{aq}) \rightarrow \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\ell)$
 - $\text{Zn}(\text{s}) + \text{CuNO}_3(\text{aq}) \rightarrow \text{Cu}(\text{s}) + \text{ZnNO}_3(\text{aq})$
 - $\text{Ca}(\text{OH})_2(\text{aq}) + 2\text{HCl}(\text{aq}) \rightarrow \text{CaCl}_2(\text{aq}) + 2\text{H}_2\text{O}(\ell)$
 - $2\text{NH}_4\text{NO}_3(\text{s}) \rightarrow 2\text{N}_2(\text{g}) + \text{O}_2(\text{g}) + 4\text{H}_2\text{O}(\text{g})$
 - $\text{CaCO}_3(\text{s}) \rightarrow \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$
- _____ 17. Which response includes all of the following that are displacement reactions, and no other reactions?
- $\text{P}_4\text{O}_{10}(\text{s}) + 6\text{Na}_2\text{O}(\text{s}) \rightarrow 4\text{Na}_3\text{PO}_4(\text{s})$
 - $2\text{AgNO}_3(\text{aq}) + \text{Zn}(\text{s}) \rightarrow 2\text{Ag}(\text{s}) + \text{Zn}(\text{NO}_3)_2(\text{aq})$
 - $\text{Ca}(\text{s}) + 2\text{HCl}(\text{aq}) \rightarrow \text{CaCl}_2(\text{aq}) + \text{H}_2(\text{g})$
 - $\text{Fe}(\text{OH})_2(\text{s}) + 2\text{HCl}(\text{aq}) \rightarrow \text{FeCl}_2(\text{aq}) + 2\text{H}_2\text{O}(\ell)$
- I and II
 - II and III
 - II and IV
 - I and III
 - I, III, and IV
- _____ 18. Which of the following metals could displace hydrogen from sulfuric acid and form hydrogen gas?
- Cu
 - Au
 - Hg
 - Zn
 - none of these
- _____ 19. Which one of the following salts is **insoluble** in water?
- FeCl₂
 - KCH₃COO
 - Pb(NO₃)₂
 - PbS
 - NH₄Cl
- _____ 20. What is the correct name for NaClO?
- sodium hypochlorite
 - sodium chlorite
 - sodium chloride
 - sodium chlorate
 - sodium perchlorate
- _____ 21. Consider the complete neutralization of HBr by Ca(OH)₂. Which of the following statements about this neutralization is **false**?
- CaBr₂ is the salt formed.

- b. The production of water is the driving force for the this reaction.
- c. The salt formed is insoluble in water.
- d. HBr is a strong acid and Ca(OH)₂ is a strong base.
- e. No gas is formed in this reaction.

___ 22. Write the **net ionic** equation for the complete reaction of barium hydroxide and hydrochloric acid. Use H⁺ rather than H₃O⁺. What is the sum of the coefficients? (Do not forget coefficients of one.)
a. 3 b. 7 c. 8 d. 4 e. 5

___ 23. Write the **net ionic** equation for the complete neutralization of calcium hydroxide with dilute sulfuric acid. Use H⁺ rather than H₃O⁺. What is the sum of the coefficients? (Do not forget coefficients of one.)
a. 6 b.7 c. 4 d. 3 e. 5

___ 24. Will a precipitate form when 0.1 M aqueous solutions of AgNO₃ and NaCl are mixed? If a precipitate does form, **identify** the precipitate and give the **net ionic** equation for the reaction.
a. No precipitate forms.

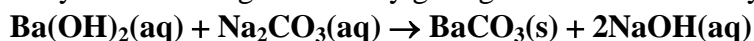
- b. AgCl precipitates. $\text{Ag}^+(\text{aq}) + \text{Cl}^-(\text{aq}) \rightarrow \text{AgCl}(\text{s})$
- c. Ag₃N precipitates. $6\text{Ag}^+(\text{aq}) + 2\text{NO}_3^-(\text{aq}) \rightarrow 2\text{Ag}_3\text{N}(\text{s}) + 3\text{O}_2(\text{g})$
- d. AgCl precipitates. $\text{Ag}^+(\text{aq}) + \text{NaCl}(\text{aq}) \rightarrow \text{AgCl}(\text{s}) + \text{Na}^+(\text{aq})$
- e. NaNO₃ precipitates. $\text{NO}_3^-(\text{aq}) + \text{Na}^+(\text{aq}) \rightarrow \text{NaNO}_3(\text{s})$

Reaction Types

Use these reaction types to answer the following question(s).

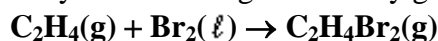
- I. Redox II. Combination III. decomposition
- IV. Displacement V. metathesis

___ 25. Classify the following reaction by giving **all** of the reaction type(s) that apply.



- a. only I b. only II c. only V
- d. only IV e. II and III

___ 26. Classify the following reaction by giving **all** of the reaction type(s) that apply.



- a. only III b. only II c. I and II d. II and IV e. II and V

___ 27. What is a vertical **column** on the periodic table called?

- a. a group b. a period c. a clan d. the metals

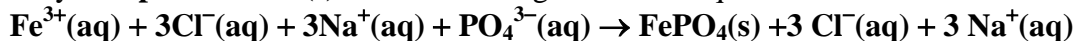
___ 28. Which one of the following phrases best describes a **strong acid**?

- a. any acid that attacks metals
- b. an acid that does not ionize in water
- c. an acid that is highly ionized in water
- d. an acid that is slightly ionized in water

___ 29. Which one of the following acids is the **weakest**?

- a. hydrofluoric acid, HF
- b. hydrobromic acid, HBr
- c. nitric acid, HNO₃
- d. sulfuric acid, H₂SO₄

___ 30. Identify the **spectator ion(s)** in the following total ionic equation:



- a. Fe³⁺(aq) and PO₄³⁻(aq)
- b. Cl⁻(aq) and Na⁺(aq)
- c. FePO₄(s)
- d. Fe³⁺(aq) and Na⁺(aq)

Chapter 4 Homework Answer Section

MULTIPLE CHOICE

- ANS: D PTS: 1
TOP: The Periodic Table: Metals, Nonmetals, and Metalloids
- ANS: B PTS: 1
TOP: The Periodic Table: Metals, Nonmetals, and Metalloids
- ANS: D PTS: 1 TOP: Aqueous Solutions--An Introduction
- ANS: C PTS: 1 TOP: Aqueous Solutions--An Introduction
- ANS: D PTS: 1 TOP: Aqueous Solutions--An Introduction
- ANS: D PTS: 1 TOP: Aqueous Solutions--An Introduction
- ANS: A PTS: 1 TOP: Reactions in Aqueous Solutions
- ANS: B PTS: 1 TOP: Oxidation Numbers
- ANS: E PTS: 1 TOP: Oxidation Numbers
- ANS: A PTS: 1 TOP: Naming Ternary Acids and Their Salts
- ANS: B PTS: 1 TOP: Naming Ternary Acids and Their Salts
- ANS: E PTS: 1 TOP: Naming Ternary Acids and Their Salts
- ANS: B PTS: 1 TOP: Oxidation-Reduction Reactions
- ANS: C PTS: 1 TOP: Decomposition Reactions
- ANS: E PTS: 1 TOP: Decomposition Reactions
- ANS: D PTS: 1 TOP: Decomposition Reactions
- ANS: B PTS: 1 TOP: Displacement Reactions
- ANS: D PTS: 1 TOP: Displacement Reactions
- ANS: D PTS: 1 TOP: Aqueous Solutions--An Introduction
- ANS: A PTS: 1 TOP: Naming Ternary Acids and Their Salts
- ANS: C PTS: 1 TOP: Metathesis (Acid--Base) Reactions
- ANS: A PTS: 1 TOP: Metathesis (Acid--Base) Reactions
- ANS: D PTS: 1 TOP: Metathesis (Acid--Base) Reactions
- ANS: B PTS: 1 TOP: Metathesis (Acid--Base) Reactions
- ANS: C PTS: 1 TOP: Summary of Reaction Types
- ANS: C PTS: 1 TOP: Summary of Reaction Types
- ANS: A PTS: 1 TOP: Additional Questions
- ANS: C PTS: 1 TOP: Additional Questions
- ANS: A PTS: 1 TOP: Additional Questions
- ANS: B PTS: 1