

## Chapter 11 Practice Test

## Multiple Choice

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

\*You will need your own calculator for blast from the past questions.

- \_\_\_\_\_ 1. Some of the molecules found in the human body are NHCHCOOH (glycine), CHO(glucose), and CH<sub>3</sub>(CH<sub>2</sub>)<sub>16</sub>COOH (stearic acid). The bonds they form are
- |             |             |
|-------------|-------------|
| a. covalent | c. metallic |
| b. ionic    | d. nuclear  |
- \_\_\_\_\_ 2. H<sub>2</sub>O<sub>2</sub>, hydrogen peroxide, naturally breaks down into HO<sub>2</sub> and O<sub>2</sub> over time. MnO<sub>2</sub>, manganese dioxide, can be used to lower the energy of activation needed for this reaction to take place and, thus, increase the rate of reaction. What type of substance is MnO<sub>2</sub>?
- |                 |               |
|-----------------|---------------|
| a. an inhibitor | c. a product  |
| b. a catalyst   | d. a reactant |
- \_\_\_\_\_ 3. 
$$\text{C}_3\text{H}_8 + \text{O}_2 \longrightarrow \text{CO}_2 + \text{H}_2\text{O}$$
- This chemical equation represents the combustion of propane. When correctly balanced, the coefficient for water is
- |      |       |
|------|-------|
| a. 2 | c. 8  |
| b. 4 | d. 16 |
- \_\_\_\_\_ 4. Which of the following is a balanced equation for the combustion of ethanol (CH<sub>3</sub>CH<sub>2</sub>OH)?
- |  |  |
|--|--|
| a. CH <sub>3</sub> CH <sub>2</sub> OH + 3O <sub>2</sub> → CO <sub>2</sub> + 2H <sub>2</sub> O  | c. CH <sub>3</sub> CH <sub>2</sub> OH + O <sub>2</sub> → 2CO <sub>2</sub> + 3H <sub>2</sub> O  |
| b. CH <sub>3</sub> CH <sub>2</sub> OH + 3O <sub>2</sub> → 2CO <sub>2</sub> + 3H <sub>2</sub> O | d. CH <sub>3</sub> CH <sub>2</sub> OH + 3O <sub>2</sub> → 2CO <sub>2</sub> + 2H <sub>2</sub> O |
- \_\_\_\_\_ 5. 
$$\text{Mg}_3\text{N}_2(\text{s}) + 6\text{H}_2\text{O}(\text{l}) \longrightarrow$$
- $$2\text{NH}_3(\text{aq}) + 3\text{Mg}(\text{OH})_2(\text{s})$$
- Classify the following reaction.
- |                       |                       |
|-----------------------|-----------------------|
| a. combination        | c. single replacement |
| b. double replacement | d. combustion         |
- \_\_\_\_\_ 6. What type of reaction is the reaction below?
- $$\text{Fe}_2\text{O}_3 \rightarrow \text{Fe} + \text{O}_2$$
- |                          |                       |
|--------------------------|-----------------------|
| a. Synthesis/Combination | c. Combustion         |
| b. Decomposition         | d. Single Replacement |
- \_\_\_\_\_ 7. What type of reaction is the reaction below?
- $$\text{Al} + \text{CuSO}_4 \rightarrow \text{Al}_2(\text{SO}_4)_3 + \text{Cu}$$
- |                          |                       |
|--------------------------|-----------------------|
| a. Synthesis/Combination | c. Double Replacement |
| b. Decomposition         | d. Single Replacement |



\_\_\_ 18. The correct balanced equation for the reaction below is:



- |            |            |
|------------|------------|
| a. 2,2,2,1 | c. 2,1,1,1 |
| b. 2,2,1,1 | d. 2,1,1,2 |

\_\_\_ 19. Chlorine Gas is bubbled through a solution of calcium bromide at room temperature and produces bromine gas and calcium chloride. Choose all the correct product(s) for the reaction.

- |                                  |                                |
|----------------------------------|--------------------------------|
| a. $\text{Br}_2$                 | c. $\text{BrCl}$               |
| b. $\text{Br}_2 + \text{CaCl}_2$ | d. $\text{CaCl}_2 + \text{Br}$ |

\_\_\_ 20. A flaming splint of wood is extinguished by what gas?

- |                   |             |
|-------------------|-------------|
| a. carbon dioxide | c. water    |
| b. oxygen         | d. hydrogen |

\_\_\_ 21. A glowing splint of wood ignites from what gas?

- |                   |             |
|-------------------|-------------|
| a. carbon dioxide | c. water    |
| b. oxygen         | d. hydrogen |

\_\_\_ 22. Phenolphthalein indicator turns pink from the presence of a:

- |           |          |
|-----------|----------|
| a. base   | c. acid  |
| b. oxygen | d. water |

\_\_\_ 23.  $\text{Cu}_{(s)} + \text{O}_{2(g)} \rightarrow \underline{\hspace{1cm}}$ .

The following reactants would produce what type of reaction?

- |                       |                       |
|-----------------------|-----------------------|
| a. decomposition      | c. double replacement |
| b. single replacement | d. combination        |

\_\_\_ 24. Two reactants are combined to produce a salt and water; these are the products of a reaction between:

- |                                  |                              |
|----------------------------------|------------------------------|
| a. a nonmetallic oxide and water | c. an acid and a base        |
| b. a metallic oxide and water    | d. a carbohydrate and oxygen |

\_\_\_ 25.  $\underline{\text{a}} \text{ LiOH} + \underline{\text{b}} \text{ H}_3\text{PO}_4 \rightarrow ? + ? + \dots$

This reaction represents a special (exceptional) case of a reaction, which is the:

- |                         |                              |
|-------------------------|------------------------------|
| a. formation of an acid | c. acid-base neutralization  |
| b. formation of a base  | d. formation of hydrogen gas |

\_\_\_ 26. Hydrogen peroxide breaks down in the presence of manganese dioxide to produce a vapor that is steam and a gas that relights a glowing splint:

- |   |   |
|---|---|
| a. $\text{H}_2\text{O}_{(l)} + \text{MnO}_{3(g)}$ | c. $\text{H}_2\text{O}_{(l)} + \text{O}_{2(g)}$   |
| b. $\text{H}_2\text{O}_{(g)} + \text{O}_{2(g)}$   | d. $\text{H}_2\text{O}_{(l)} + \text{MnO}_{2(g)}$ |

\_\_\_ 27.  $\underline{\hspace{1cm}} \text{Al} + \underline{\hspace{1cm}} \text{CuSO}_4 \rightarrow \text{Cu} + \text{Al}_2(\text{SO}_4)_3$

Predict the products and then balance the reactions and choose the correct coefficients.

- |               |               |
|---------------|---------------|
| a. 4, 3, 2, 6 | c. 2, 3, 1, 3 |
| b. 2, 1, 1, 3 | d. 2, 1, 3, 6 |

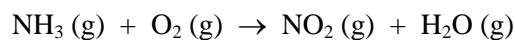
\_\_\_ 28.  $\underline{\hspace{1cm}} \text{Li}_2\text{O} + \underline{\hspace{1cm}} \text{H}_2\text{O} \rightarrow ?$

The product for this reaction could be classified as a(an)?

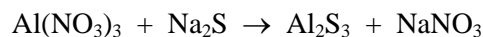
- |         |         |
|---------|---------|
| a. acid | b. base |
|---------|---------|



- \_\_\_\_\_ 36. Of the reactions below, which one is a decomposition reaction?
- $\text{NH}_4\text{Cl} \rightarrow \text{NH}_3 + \text{HCl}$
  - $2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$
  - $2\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$
  - $2\text{CH}_4 + 4\text{O}_2 \rightarrow 2\text{CO}_2 + 4\text{H}_2\text{O}$
  - $\text{Cd}(\text{NO}_3)_2 + \text{Na}_2\text{S} \rightarrow \text{CdS} + 2\text{NaNO}_3$
- \_\_\_\_\_ 37. Which of the following are combination reactions?
- $\text{CH}_4(\text{g}) + \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l})$
  - $\text{CaO}(\text{s}) + \text{CO}_2(\text{g}) \rightarrow \text{CaCO}_3(\text{s})$
  - $\text{Mg}(\text{s}) + \text{O}_2(\text{g}) \rightarrow \text{MgO}(\text{s})$
  - $\text{PbCO}_3(\text{s}) \rightarrow \text{PbO}(\text{s}) + \text{CO}_2(\text{g})$
- 1, 2, and 3
  - 2 and 3
  - 1, 2, 3, and 4
  - 4 only
  - 2, 3, and 4
- \_\_\_\_\_ 38. Which of the following are decomposition reactions?
- $\text{CH}_4(\text{g}) + \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l})$
  - $\text{CaO}(\text{s}) + \text{CO}_2(\text{g}) \rightarrow \text{CaCO}_3(\text{s})$
  - $\text{Mg}(\text{s}) + \text{O}_2(\text{g}) \rightarrow \text{MgO}(\text{s})$
  - $\text{PbCO}_3(\text{s}) \rightarrow \text{PbO}(\text{s}) + \text{CO}_2(\text{g})$
- 1, 2, and 3
  - 4 only
  - 1, 2, 3, and 4
  - 2 and 3
  - 2, 3, and 4
- \_\_\_\_\_ 39. When the following equation is balanced, the coefficients are \_\_\_\_\_.

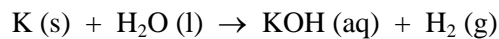


- 1, 1, 1, 1
  - 4, 7, 4, 6
  - 2, 3, 2, 3
  - 1, 3, 1, 2
  - 4, 3, 4, 3
- \_\_\_\_\_ 40. When the following equation is balanced, the coefficients are \_\_\_\_\_.



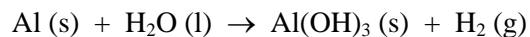
- 2, 3, 1, 6
- 2, 1, 3, 2
- 1, 1, 1, 1
- 4, 6, 3, 2
- 2, 3, 2, 3

\_\_\_\_ 41. When the following equation is balanced, the coefficient of H<sub>2</sub> is \_\_\_\_.



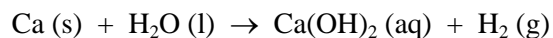
- a. 1
- b. 2
- c. 3
- d. 4
- e. 5

\_\_\_\_ 42. When the following equation is balanced, the coefficient of Al is \_\_\_\_.



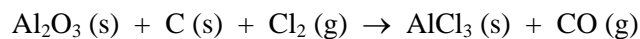
- a. 1
- b. 2
- c. 3
- d. 5
- e. 4

\_\_\_\_ 43. When the following equation is balanced, the coefficient of H<sub>2</sub>O is \_\_\_\_.



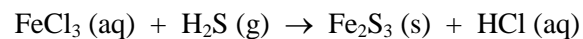
- a. 1
- b. 2
- c. 3
- d. 5
- e. 4

\_\_\_\_ 44. When the following equation is balanced, the coefficient of Al<sub>2</sub>O<sub>3</sub> is \_\_\_\_.



- a. 1
- b. 2
- c. 3
- d. 4
- e. 5

\_\_\_\_ 45. When the following equation is balanced, the coefficient of H<sub>2</sub>S is \_\_\_\_.



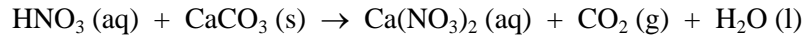
- a. 1
- b. 2
- c. 3
- d. 5
- e. 4

\_\_\_\_ 46. When the following equation is balanced, the coefficient of HCl is \_\_\_\_.



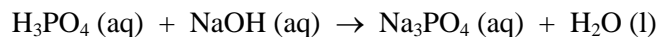
- a. 1
- b. 2
- c. 3
- d. 4
- e. 0

\_\_\_ 47. When the following equation is balanced, the coefficient of  $\text{HNO}_3$  is \_\_\_\_.



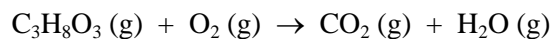
- a. 1
- b. 2
- c. 3
- d. 5
- e. 4

\_\_\_ 48. When the following equation is balanced, the coefficient of  $\text{H}_3\text{PO}_4$  is \_\_\_\_.



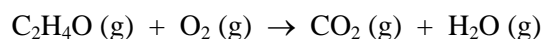
- a. 1
- b. 2
- c. 3
- d. 4
- e. 0

\_\_\_ 49. When the following equation is balanced, the coefficient of  $\text{C}_3\text{H}_8\text{O}_3$  is \_\_\_\_.



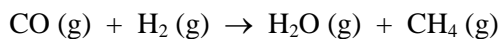
- a. 1
- b. 2
- c. 3
- d. 7
- e. 5

\_\_\_ 50. When the following equation is balanced, the coefficient of  $\text{O}_2$  is \_\_\_\_.



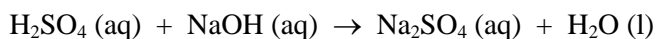
- a. 2
- b. 3
- c. 4
- d. 5
- e. 1

\_\_\_ 51. Classify the following reaction.



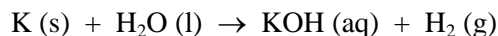
- a. combination
- b. combustion
- c. single replacement
- d. double replacment

\_\_\_ 52. When the following equation is balanced, the coefficient of  $\text{H}_2\text{SO}_4$  is \_\_\_\_.



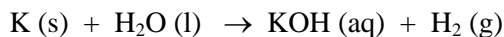
- a. 1
- b. 2
- c. 3
- d. 4

\_\_\_\_ 53. When the following equation is balanced, the coefficient of water is \_\_\_\_.



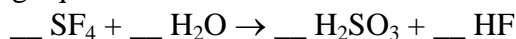
- a. 1
- b. 2
- c. 3
- d. 4
- e. 5

\_\_\_\_ 54. When the following equation is balanced, the coefficient of hydrogen is \_\_\_\_.



- a. 1
- b. 2
- c. 3
- d. 4
- e. 5

\_\_\_\_ 55. Balance the following equation and list the coefficients in order from left to right.



- a. 1, 1, 1, 4
- b. 2, 6, 2, 8
- c. 1, 2, 1, 4
- d. 1, 3, 1, 4

\_\_\_\_ 56. Iron metal reacts with hydrochloric acid to produce iron (II) chloride and hydrogen gas. Identify the balanced reaction that describes this process.

- a.  $\text{Fe} + 2 \text{HCl} \rightarrow \text{FeCl}_2 + \text{H}_2$
- b.  $\text{Fe} + \text{HCl} \rightarrow \text{FeCl}_2 + \text{H}_2$
- c.  $\text{Fe} + \text{HCl} \rightarrow \text{FeCl} + \text{H}$
- d.  $2\text{Fe} + 2\text{HCl} \rightarrow 2\text{FeCl}_2 + \text{H}_2$

\_\_\_\_ 57. 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  $\text{O}_2$  is a \_\_\_\_.

- a. catalyst
- b. solid
- c. product
- d. reactant

\_\_\_\_ 58. This symbol ( $\rightleftharpoons$ ) indicates that \_\_\_\_.

- a. heat must be applied
- b. an incomplete combustion reaction has occurred
- c. a gas is formed by the reaction
- d. the reaction is reversible

\_\_\_\_ 59. In every balanced chemical equation, each side of the equation has the same number of \_\_\_\_.

- a. atoms of each element
- b. molecules
- c. moles
- d. coefficients

\_\_\_\_ 60. When potassium hydroxide and barium chloride react, potassium chloride and barium hydroxide are formed. The balanced equation for this reaction is \_\_\_\_.

- a.  $\text{KH} + \text{BaCl} \rightarrow \text{KCl} + \text{BaH}$
- b.  $\text{KOH} + \text{BaCl} \rightarrow \text{KCl} + \text{BaOH}$
- c.  $2\text{KOH} + \text{BaCl}_2 \rightarrow 2\text{KCl} + \text{Ba}(\text{OH})_2$
- d.  $\text{KOH} + \text{BaCl}_2 \rightarrow \text{KCl}_2 + \text{BaOH}$



- \_\_\_\_\_ 61. Which of the following is the correct skeleton equation for the reaction that takes place when solid phosphorus combines with oxygen gas to form diphosphorus pentoxide?
- a.  $P(s) + O_2(g) \rightarrow PO_2(g)$                       c.  $P(s) + O_2(g) \rightarrow P_2O_5(s)$   
b.  $P(s) + O(g) \rightarrow P_5O_2(g)$                       d.  $P_2O_5(s) \rightarrow P_2(s) + O_2(g)$
- \_\_\_\_\_ 62. When the equation  $Fe + Cl_2 \rightarrow FeCl_3$  is balanced, what is the coefficient for  $Cl_2$ ?
- a. 1    c. 3  
b. 2    d. 4
- \_\_\_\_\_ 63. The products of a combustion reaction do NOT include \_\_\_\_\_.  
a. water    c. carbon monoxide  
b. carbon dioxide    d. hydrogen
- \_\_\_\_\_ 64. The equation  $Mg(s) + 2HCl(aq) \rightarrow MgCl_2(aq) + H_2(g)$  is an example of which type of reaction?  
a. combination reaction    c. decomposition reaction  
b. single-replacement reaction    d. double-replacement reaction
- \_\_\_\_\_ 65. A solution of zinc sulfide (assume that zinc sulfide is soluble) reacts with oxygen gas to yield a solution of zinc sulfate.

The correct skeletal chemical equation for the above reaction is:

- a.  $ZnS_{(l)} + O_{2(g)} \rightarrow ZnSO_{4(l)}$                       d.  $ZnS_{(aq)} + O_{2(g)} \rightarrow ZnSO_{2(aq)}$   
b.  $ZnS_{(aq)} + O_{2(g)} \rightarrow ZnSO_{4(aq)}$                       e.  $ZnS_{(aq)} + O_{2(g)} \rightarrow ZnSO_{3(aq)}$   
c.  $ZnS_{(l)} + O_{2(g)} \rightarrow ZnSO_{3(l)}$

## Chapter 11 Practice Test Answer Section

### MULTIPLE CHOICE

- |            |        |   |
|------------|--------|---|
| 1. ANS: A  | PTS: 1 |   |
| 2. ANS: B  | PTS: 1 |   |
| 3. ANS: B  | PTS: 1 |   |
| 4. ANS: B  | PTS: 1 |   |
| 5. ANS: B  | PTS: 1 |   |
| 6. ANS: B  | PTS: 1 | KEY: Types of Reactions; Decomposition      |
| 7. ANS: D  | PTS: 1 | KEY: Types of Reactions; Single Replacement |
| 8. ANS: A  | PTS: 1 | KEY: Types of Reactions; Double Replacement |
| 9. ANS: D  | PTS: 1 | KEY: Types of Reactions; Single Replacement |
| 10. ANS: A | PTS: 1 | KEY: Balancing Equations                    |
| 11. ANS: A | PTS: 1 | KEY: Balancing Equations                    |
| 12. ANS: A | PTS: 1 | KEY: Predicting Products                    |
| 13. ANS: B | PTS: 1 | KEY: Single Replacement;                    |
| 14. ANS: B | PTS: 1 | KEY: Single Replacement;                    |
| 15. ANS: A | PTS: 1 | KEY: Single Replacement;                    |
| 16. ANS: B | PTS: 1 | KEY: Single Replacement;                    |
| 17. ANS: C | PTS: 1 | KEY: Volume to Moles; Molar Volume          |
| 18. ANS: A | PTS: 1 | KEY: Predicting Products                    |
| 19. ANS: B | PTS: 1 | KEY: Predicting Products                    |
| 20. ANS: A | PTS: 1 | KEY: Predicting Products                    |
| 21. ANS: B | PTS: 1 | KEY: Predicting Products                    |
| 22. ANS: A | PTS: 1 | KEY: Predicting Products                    |
| 23. ANS: D | PTS: 1 | KEY: Predicting Products                    |
| 24. ANS: C | PTS: 1 | KEY: Predicting Products                    |
| 25. ANS: C | PTS: 1 | KEY: Predicting Products                    |
| 26. ANS: B | PTS: 1 | KEY: Predicting Products                    |
| 27. ANS: C | PTS: 1 |   |
| 28. ANS: B | PTS: 1 |   |
| 29. ANS: C | PTS: 1 |   |
| 30. ANS: D | PTS: 1 |   |
| 31. ANS: A | PTS: 1 |   |
| 32. ANS: E | PTS: 1 |   |
| 33. ANS: A | PTS: 1 |   |
| 34. ANS: E | PTS: 1 |   |
| 35. ANS: A | PTS: 1 |   |
| 36. ANS: A | PTS: 1 |   |
| 37. ANS: B | PTS: 1 |   |
| 38. ANS: B | PTS: 1 |   |
| 39. ANS: B | PTS: 1 |   |
| 40. ANS: A | PTS: 1 |   |

- 41. ANS: A                   PTS: 1
- 42. ANS: B                   PTS: 1
- 43. ANS: B                   PTS: 1
- 44. ANS: A                   PTS: 1
- 45. ANS: C                   PTS: 1
- 46. ANS: B                   PTS: 1
- 47. ANS: B                   PTS: 1
- 48. ANS: A                   PTS: 1
- 49. ANS: B                   PTS: 1
- 50. ANS: D                   PTS: 1
- 51. ANS: B                   PTS: 1
- 52. ANS: A                   PTS: 1
- 53. ANS: B                   PTS: 1
- 54. ANS: A                   PTS: 1
- 55. ANS: D                   PTS: 1
- 56. ANS: A                   PTS: 1
- 57. ANS: C                   PTS: 1
- 58. ANS: D                   PTS: 1
- 59. ANS: A                   PTS: 1
- 60. ANS: C                   PTS: 1
- 61. ANS: C                   PTS: 1
- 62. ANS: C                   PTS: 1
- 63. ANS: D                   PTS: 1
- 64. ANS: B                   PTS: 1
- 65. ANS: B                   PTS: 1