The Mole and Stoichiometry Worksheet

Write answers and show all work for calculations on a separate sheet of paper. Box your final answers, written to the correct number of significant figures, to each calculation.


UNIT 7 REVIEW

1. The chemical formula for sucrose is $C_{12}H_{22}O_{11}$.

   a. What type of compound is sucrose?

   b. Is the formula for sucrose its empirical or its molecular formula?

   c. What type of particle makes up sucrose?

   d. How many such particles are in 1 mole of sucrose?

   e. How many such particles are in 3.75 moles of sucrose?

2. a. How many moles of oxygen are in 1 mole of sucrose?

   b. How many moles of oxygen are in 3.75 moles of sucrose?

   c. How many moles of carbon are in 0.65 moles of sucrose?

   d. What is the mass (in grams) of carbon in 0.65 moles of sucrose?

3. a. Calculate the molar mass of sucrose (that is, the mass in grams equal to 1 mole of sucrose)?

   b. How many grams are in 3.75 moles of sucrose?

4. A recipe requires 350.0 grams of sucrose.

   a. How many moles of sucrose would be present?

   b. How many particles of sucrose would be present?

5. A student needs a sample of sucrose containing 2.45×10^{24} particles.

   a. How many moles of sucrose would be required?

   b. How many grams of sucrose would the student need?

6. Calculate the percent composition for each element in sucrose. Remember, the molar mass of sucrose was calculated in #3 above.

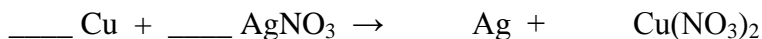## UNIT 8 PRACTICE

Mole-to-Mole Conversions

Balance the following chemical equation and use for Questions #7, #8, and #9.

$$\_\_\_\_ \ Pb(NO_3)_2 \ + \ \_\_\_\_ \ NaCl \ \rightarrow \ \_\_\_\_ \ PbCl_2 \ + \ \_\_\_\_ \ NaNO_3$$
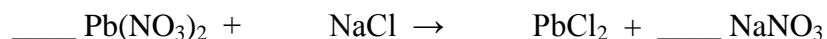
7. How many moles of $Pb(NO_3)_2$ are needed to react completely with 0.0550 moles of NaCl?

8. How many moles of $PbCl_2$ will be formed when 0.575 moles of NaCl react with excess $Pb(NO_3)_2$?

9. How many moles of sodium nitrate are produced when 1.95 moles $Pb(NO_3)_2$ react with excess NaCl?
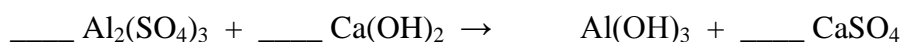
Mole-to-Mass Conversions

Balance the following chemical equation and use for Questions #10, #11, and #12.

$$\text{\_\_\_\_ Cu} + \text{\_\_\_\_ AgNO}_3 \rightarrow \text{\_\_\_\_ Ag} + \text{\_\_\_\_ Cu(NO}_3)_2$$

10. Calculate the grams of $Cu(NO_3)_2$ produced by 1.89 moles copper reacting with excess $AgNO_3$.
11. How many grams of copper are needed to react completely with 2.905 moles $AgNO_3$?
12. How much $AgNO_3$ in grams will be required to produce 9.70 moles $Cu(NO_3)_2$?

Mass-to-Mole Conversions

Balance the following chemical equation and use for Questions #13, #14, and #15.

$$\text{\_\_\_\_ Al}_2(\text{SO}_4)_3 + \text{\_\_\_\_ Ca(OH)}_2 \rightarrow \text{\_\_\_\_ Al(OH)}_3 + \text{\_\_\_\_ CaSO}_4$$

13. If 165.7 grams of aluminum sulfate react with excess calcium hydroxide, how many moles of aluminum hydroxide will be formed?
14. Determine the number of moles of calcium hydroxide needed to react completely with 200. grams of aluminum sulfate.
15. How many moles of calcium hydroxide are necessary to produce 45.75 grams of aluminum hydroxide?

Mass-to-Mass Conversions

Balance the following chemical equation and use for Questions #16, #17, and #18.

$$\text{\_\_\_\_ HCl} + \text{\_\_\_\_ CaCO}_3 \rightarrow \text{\_\_\_\_ H}_2\text{O} + \text{\_\_\_\_ CO}_2 + \text{\_\_\_\_ CaCl}_2$$

16. Hydrochloric acid (HCl) reacts with excess calcium carbonate to produce 7.45 grams of carbon dioxide. How many grams of hydrochloric acid were needed to produce this amount of carbon dioxide?
17. How many grams of calcium carbonate are needed to react completely with 125.0 grams of hydrochloric acid?
18. A 75.0-gram sample of HCl reacts completely with excess calcium carbonate. How much calcium chloride (in grams) will be produced?

Conversions: Mixed Review

Balance the following chemical equation and use for Questions #19, #20, #21, and #22.

$$\text{\_\_\_\_ Al} + \text{\_\_\_\_ O}_2 \rightarrow \text{\_\_\_\_ Al}_2\text{O}_3$$

19. If 10.0 moles of aluminum oxide were produced, how many moles of oxygen were required?
20. How many grams of oxygen were required to produce 4.5 moles of aluminum oxide?
21. How many moles of aluminum oxide are produced when 2.50 grams of aluminum are used?
22. How many grams of oxygen are required to react completely with 0.0357 grams of aluminum?