

- 1) How many moles are in 40.0 grams of water?
- 2) How many grams are in 3.7 moles of Na_2O ?
- 3) How many atoms are in 14 moles of cadmium?
- 4) How many moles are in 4.3×10^{22} molecules of H_3PO_4 ?
- 5) How many molecules are in 48.0 grams of NaOH ?
- 6) How many grams are in 4.63×10^{24} molecules of CCl_4 ?

Solutions

- 1) How many moles are in 40.0 grams of water?

$$40.0 \text{ g H}_2\text{O} \times \frac{1 \text{ mole H}_2\text{O}}{18.01 \text{ g H}_2\text{O}} = 2.22 \text{ mole H}_2\text{O}$$

- 2) How many grams are in 3.7 moles of Na₂O?

$$3.7 \text{ moles Na}_2\text{O} \times \frac{62 \text{ g Na}_2\text{O}}{1 \text{ mole Na}_2\text{O}} = 230 \text{ g Na}_2\text{O}$$

- 3) How many atoms are in 14 moles of cadmium?

$$14 \text{ mole Cd} \times \frac{6.022 \times 10^{23} \text{ atoms Cd}}{1 \text{ mole Cd}} = 8.4 \times 10^{23} \text{ atoms Cd}$$

- 4) How many moles are in 4.3×10^{22} molecules of H₃PO₄?

$$4.3 \times 10^{22} \text{ molecules H}_3\text{PO}_4 \times \frac{1 \text{ mole H}_3\text{PO}_4}{6.022 \times 10^{23} \text{ molecules H}_3\text{PO}_4} = 7.1 \times 10^{-2} \text{ moles H}_3\text{PO}_4$$

- 5) How many molecules are in 48.0 grams of NaOH?

$$48.0 \text{ g NaOH} \times \frac{1 \text{ mole NaOH}}{40 \text{ g NaOH}} \times \frac{6.022 \times 10^{23} \text{ molecules NaOH}}{1 \text{ mole NaOH}} = 7.23 \times 10^{23} \text{ molecules NaOH}$$

- 6) How many grams are in 4.63×10^{24} molecules of CCl₄?

$$4.63 \times 10^{24} \text{ molecules CCl}_4 \times \frac{1 \text{ mole CCl}_4}{6.022 \times 10^{23} \text{ molecules CCl}_4} \times \frac{153.8 \text{ g CCl}_4}{1 \text{ mole CCl}_4} = 1180 \text{ g CCl}_4$$

Mole Worksheet

Use two decimal places for the molar masses and report your answer to the correct number of significant figures.

I. Calculate either the number of grams or the number of moles.

- 1) 3.00 mol NH_3
- 2) 9.02 mol H_2O
- 3) 0.2000 mol SO_3
- 4) 0.0106 mol NO_2
- 5) 6.0 mol MgCl_2
- 6) 12.7 g I_2
- 7) 8.00 g NaOH
- 8) 5.657 g H_2SO_4
- 9) 32 g KNO_3
- 10) 28.4 g $\text{C}_{12}\text{H}_{22}\text{O}_{11}$

Solutions

I. Calculate either the number of grams or the number of moles.

$$1) \quad m = 3.00 \text{ mol-NH}_3 \times 17.04 \text{ g NH}_3/1 \text{ mol-NH}_3 = 51.1 \text{ g NH}_3$$

$$2) \quad m = 9.02 \text{ mol-H}_2\text{O} \times 18.02 \text{ g H}_2\text{O}/1 \text{ mol-H}_2\text{O} = 163 \text{ g H}_2\text{O}$$

$$3) \quad m = 0.2000 \text{ mol-SO}_3 \times 80.06 \text{ g SO}_3/1 \text{ mol-SO}_3 = 16.01 \text{ g SO}_3$$

$$4) \quad m = 0.0106 \text{ mol-NO}_2 \times 46.01 \text{ g NO}_2/1 \text{ mol-NO}_2 = 0.488 \text{ g NO}_2$$

$$5) \quad m = 6.0 \text{ mol-MgCl}_2 \times 95.21 \text{ g MgCl}_2/1 \text{ mol-MgCl}_2 = 570 \text{ g MgCl}_2$$

$$6) \quad n = 12.7 \text{ g-I}_2 \times 1 \text{ mol I}_2/253.83 \text{ g-I}_2 = 0.0500 \text{ mol I}_2$$

$$7) \quad n = 8.00 \text{ g-NaOH} \times 1 \text{ mol NaOH}/40.00 \text{ g-NaOH} = 0.200 \text{ mol NaOH}$$

$$8) \quad n = 5.657 \text{ g-H}_2\text{SO}_4 \times 1 \text{ mol H}_2\text{SO}_4/98.08 \text{ g-H}_2\text{SO}_4 = 0.05768 \text{ mol H}_2\text{SO}_4$$

$$9) \quad n = 32 \text{ g-KNO}_3 \times 1 \text{ mol KNO}_3/101.11 \text{ g-KNO}_3 = 0.32 \text{ mol KNO}_3$$

$$10) \quad n = 28.4 \text{ g C}_{12}\text{H}_{22}\text{O}_{11} \times 1 \text{ mol C}_{12}\text{H}_{22}\text{O}_{11}/342.34 \text{ g C}_{12}\text{H}_{22}\text{O}_{11} = \\ 0.830 \text{ mol C}_{12}\text{H}_{22}\text{O}_{11}$$

Mole Calculation Practice Worksheet

Answer the following questions:

- 1) How many moles are in 25.0 grams of water?
- 2) How many grams are in 4.500 moles of Li_2O ?
- 3) How many molecules are in 23.0 moles of oxygen?
- 4) How many moles are in 3.4×10^{23} molecules of H_2SO_4 ?
- 5) How many molecules are in 25.0 grams of NH_3 ?
- 6) How many grams are in 8.200×10^{22} molecules of N_2I_6 ?

Mole Calculation Practice Worksheet Solutions

Answer the following questions:

- 1) How many moles are in 25.0 grams of water?

1.39 moles

1 mole H_2O = 18.0 g H_2O

$$\frac{25 \text{ g H}_2\text{O}}{18.0 \text{ g H}_2\text{O}} \times \frac{1 \text{ mol H}_2\text{O}}{1} = 1.39 \text{ mol H}_2\text{O}$$

- 2) How many grams are in 4.500 moles of Li_2O ?

134.6 grams

1 mole Li_2O = 29.90 g Li_2O

$$\frac{4.500 \text{ mol Li}_2\text{O}}{1 \text{ mol Li}_2\text{O}} \times \frac{29.90 \text{ g Li}_2\text{O}}{1} = 134.6 \text{ g Li}_2\text{O}$$

- 3) How many molecules are in 23.0 moles of oxygen?

1.38×10^{25} molecules

1 mole oxygen molecules = 6.02×10^{23} oxygen molecules

$$\frac{23.0 \text{ mol O}_2}{1 \text{ mol O}_2} \times \frac{6.02 \times 10^{23} \text{ O}_2 \text{ molecules}}{1} = 1.38 \times 10^{25} \text{ O}_2 \text{ molecules}$$

- 4) How many moles are in 3.4×10^{23} molecules of H_2SO_4 ?

0.56 moles

1 mole anything = 6.02×10^{23} anything

$$\frac{3.4 \times 10^{23} \text{ molecules H}_2\text{SO}_4}{6.02 \times 10^{23} \text{ molecules H}_2\text{SO}_4} \times \frac{1 \text{ mol H}_2\text{SO}_4}{1} = 0.56 \text{ mol H}_2\text{SO}_4$$

5) How many molecules are in 25.0 grams of NH_3 ?

8.85×10^{23} molecules

1 mole $\text{NH}_3 = 17.0 \text{ g NH}_3$

1 mole anything = 6.02×10^{23} anything

$$\frac{25.0 \text{ g NH}_3 \left| \begin{array}{c} 1 \text{ mol NH}_3 \\ 17.0 \text{ g NH}_3 \end{array} \right| \begin{array}{c} 6.02 \times 10^{23} \text{ molecules NH}_3 \\ 1 \text{ mol NH}_3 \end{array}}{\hspace{10em}} = 8.85 \times 10^{23} \text{ molecules NH}_3$$

6) How many grams are in 8.200×10^{22} molecules of N_2I_6 ?

107.5 grams

1 mole $\text{N}_2\text{I}_6 = 789.4 \text{ g N}_2\text{I}_6$

1 mole anything = 6.02×10^{23} anything

$$\frac{8.200 \times 10^{22} \text{ molecules N}_2\text{I}_6 \left| \begin{array}{c} 1 \text{ mol N}_2\text{I}_6 \\ 6.02 \times 10^{23} \text{ molecules N}_2\text{I}_6 \end{array} \right| \begin{array}{c} 789.4 \text{ g N}_2\text{I}_6 \\ 1 \text{ mol N}_2\text{I}_6 \end{array}}{\hspace{10em}} = 107.5 \text{ g N}_2\text{I}_6$$