Calculate the number of moles in 2.46×10^{21} molecules of CO_2.

a. 1.66×10^{-20}
c. 2.00×10^{4}
b. 4.09×10^{-3}
d. 1.45×10^{9}

What is the total number of atoms of all the elements in 2.50 moles of $Al_2(SO_4)_3$?

a. 1.02×10^{24} atoms
c. 2.56×10^{24} atoms
b. 1.51×10^{24} atoms
d. 5.20×10^{24} atoms

Calculate the molar mass of $(NH_4)_2C_2O_4$.

a. 100.00 g/mol
c. 240.78 g/mol
b. 124.10 g/mol
d. 316.20 g/mol

Calculate the number of moles of each element. Please round your answer to three significant digits.

5.73×10^{24} carbon atoms

_____ mol

2.06×10^{24} copper atoms

_____ mol

9.32×10^{24} sulfur atoms

_____ mol

Which of the following is the correct molar mass of N_2O_5?

a. 76.0 g/mol
c. 108.0 g/mol
b. 98.0 g/mol
d. 132.0 g/mol

Which of the following is the correct mass of 1.64 mol of $NaNO_2$?

a. 28.0 g

b. 58.4 g

c. 85.1 g

d. 113.2 g

A balloon is filled with 6.0 g of helium. What is the number of moles of helium in the balloon at STP?

a. 1.5 mol

b. 3.0 mol

c. 4.5 mol

d. 6.0 mol

Which of the following is the correct mass of 78.0 L of SO_3 at STP?

a. 111.4 g

b. 278.8 g

c. 348.2 g

d. 376.0 g

A gaseous hydrocarbon has a density of 2.59 g/L at STP. What is the identity of the hydrocarbon?

a. butane, C_4H_{10}

b. ethane, C_2H_6

c. methane, CH_4

d. propane, C_3H_8

Calculate the densities of the following gases at STP. For all elements, use a molar mass with three significant digits.

Fill in the blanks as you answer the question.

NH_3 _____ g/ L

O_2 _____ g/ L

He _____ g/ L

The air we breathe is approximately 21% oxygen. A typical breath has a volume of about 450 mL. How many grams of O_2 are in a breath of air?

Fill in the blanks as you answer the question. Round to two significant digits.

Volume of O_2 in a breath of air: _____ ml

Moles of O_2: _____ mol

Grams of O_2: _____ g

What is the percent composition of PbO_2?

a. 50% Pb, 50% O_2
b. 86.6% Pb, 13.4% O_2
c. 43.3% Pb, 56.6% O_2
d. 33.3% Pb, 66.6% O_2

Magnesium oxide can be synthesized by heating magnesium metal so that it reacts with the oxygen in the air. The following data were obtained when magnesium oxide was prepared in this way. Assume all the magnesium reacted. Use this data to calculate the percent composition of the magnesium oxide produced.

Starting mass of magnesium: 1.58 g
Mass of magnesium oxide produced: 2.62 g

a. 60.3% Mg, 39.7% O
b. 37.6% Mg, 62.4% O
c. 50% Mg, 50% O
d. 33.3% Mg, 66.6% O

Water is 11% hydrogen and 89% oxygen by mass. How many grams of oxygen are in a 250 g glass of water?

a. 27.5 g

b. 89.0 g

c. 222.5 g

d. 240.0 g

Which of these are empirical formulas? Select all that apply.

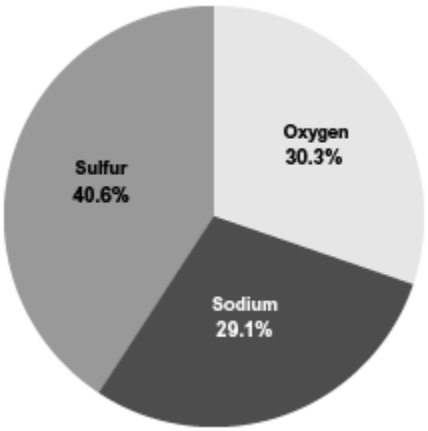
a. $C_2H_4(OH)_2$

b. $C_6H_4Cl_2$

c. $Al_2(SO_4)_3$

d. $Kr_2Cr_2O_7$

A compound is analyzed and found to have the percent composition shown in the pie chart. What is the empirical formula for this compound?



a. $Na_2S_2O_3$

b. $Na_2S_3O_2$

c. Na_1SO_4

d. Na_2SO_2

β-carotene, a compound found in carrots, has the empirical formula C_5H_7. The molar mass of β-carotene is 536 g/mol. What is its molecular formula?

a. C_5H_7

b. $C_{10}H_{14}$

c. $C_{20}H_{28}$

d. $C_{40}H_{56}$

Linoleic acid ($C_{18}H_{32}O_2$), which has a molar mass of 280.0 g/mol, is found in many vegetable oils. Determine the percent composition of this compound.

Carbon

[ ] %

Hydrogen

[ ] %

Oxygen

[ ] %