

10

CHEMICAL QUANTITIES

Practice Problems

In your notebook, solve the following problems.

SECTION 10.1 THE MOLE: A MEASUREMENT OF MATTER

- What is the molar mass of sucrose ($C_{12}H_{22}O_{11}$)? 342.3 g/mol
- What is the molar mass of each of the following compounds?
 - phosphorus pentachloride (PCl_5) 208.2 g/mol
 - uranium hexafluoride (UF_6) 352.0 g/mol
- Calculate the molar mass of each of the following ionic compounds:
 - $KMnO_4$ 158.0 g/mol
 - $Ca_3(PO_4)_2$ 310.2 g/mol
- How many moles is 3.52×10^{24} molecules of water? 5.85 moles H_2O
- How many atoms of zinc are in 0.60 mol of zinc? 3.6×10^{23} atoms
- What is the mass of 1.00 mol of oxygen (O_2)? 32.0 g O_2

SECTION 10.2 MOLE-MASS AND MOLE-VOLUME RELATIONSHIPS

- What is the molar mass of each of the following compounds?
 - $C_6H_{12}O_6$ 180.2 g/mol
 - $NaHCO_3$ 84.0 g/mol
 - C_7H_{12} 96.2 g/mol
 - KNH_4SO_4 153.2 g/mol
- Calculate the mass in grams of each of the following:
 - 8.0 mol lead oxide (PbO) 1.8×10^3 g
 - 0.75 mol hydrogen sulfide (H_2S) 26 g
 - 0.00100 mol silicon tetrahydride (SiH_4) 3.20×10^{-2} g
 - 1.50×10^{-2} mol molecular oxygen (O_2) 4.80×10^{-1} g
 - 2.30 mol ethylene glycol ($C_2H_6O_2$) 1.43×10^2 g
- How many grams are in 1.73 mol of dinitrogen pentoxide (N_2O_5)? 1.87×10^2 g
- How many grams are in 0.658 mol of calcium phosphate [$Ca_3(PO_4)_2$]? 204.1 g
- Calculate the number of moles in each of the following:
 - 0.50 g sodium bromide ($NaBr$) 4.9×10^{-3}
 - 13.5 g magnesium nitrate [$Mg(NO_3)_2$] 9.10×10^{-2}
 - 1.02 g magnesium chloride ($MgCl_2$) 1.08×10^{-2}
 - 0.00100 g monochloromethane (CH_3Cl) 1.98×10^{-5}
 - 1.50×10^{-3} g propylene glycol [$C_3H_6(OH)_2$] 1.97×10^{-5}
- A chemist plans to use 435.0 grams of ammonium nitrate (NH_4NO_3) in a reaction. How many moles of the compound is this? 5.43 mol
- A solution is to be prepared in a laboratory. The solution requires 0.0465 mol of quinine ($C_{20}H_{24}N_2O_2$). What mass, in grams, should the laboratory technician obtain in order to make the solution? 15.1 g