

Name: \_\_\_\_\_

Block: \_\_\_\_\_

Date: \_\_\_\_\_

Chemistry 11

## Mole Conversions

Assignment

- What is the volume occupied by each of the following gases at STP?
  - 10.0g of  $\text{H}_2\text{S}_{(g)}$
  - 15.0mg of  $\text{SbH}_{3(g)}$
  - $5.0 \times 10^{20}$  molecules of  $\text{BrF}_{(g)}$
  - $8.5 \times 10^{25}$  molecules of  $\text{B}_2\text{H}_{6(g)}$
- What is the mass of each of the following?
  - 1 atom of Au
  - $1.5 \times 10^{15}$  molecules of AgCl
  - 250.0mL of  $\text{C}_3\text{H}_{6(g)}$  at STP
  - 2.00L of  $\text{SF}_{6(g)}$  at STP
- How many moles are in each of the following?
  - 5.00g of  $\text{C}_{10}\text{H}_8$
  - 525mg of  $\text{K}_3\text{PO}_4$
  - 6.00L of  $\text{NO}_3\text{F}_{(g)}$  at STP
  - 1.00mL of  $\text{O}_3$  at STP
  - $4.55 \times 10^{12}$  atoms of Pt
  - $6.022 \times 10^{16}$  molecules of  $\text{PCl}_5$
- What is the molar mass of each of the following?
  - A protein molecule having a mass of  $1.25 \times 10^{-17}$ g
  - 0.179 mol of a substance having a mass of 74.0g
  - a molecule of anthracene having a mass of  $2.96 \times 10^{-22}$ g
  - $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$
  - 0.0229 mol of a substance having a mass of 2.13g
  - $\text{Co}_2\text{Fe}(\text{CN})_6$
- Answer the following questions showing all your work.
  - What is the density of  $\text{PH}_{3(g)}$  at STP? (remember density is in g/mL)
  - What is the molar volume of gold (density = 19.31g/mL)
  - How many moles are contained in 1.25mL of  $\text{CS}_{2(l)}$ ? (density = 1.26g/mL)
  - What is the density of liquid octane,  $\text{C}_8\text{H}_{18}$ , if 0.100 mol of octane has a volume of 16.2mL?
  - What volume is occupied by 0.0875 mol of silver, if silver has a density of 10.5g/mL?
  - What is the density of  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ , if 0.0275 mol of  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  has a volume of 3.01mL?
  - How many moles are contained in 7.50L of  $\text{C}_2\text{H}_5\text{OH}_{(l)}$ ? (density = 0.789g/mL)
  - If 750.0mL of gaseous fluoromethane has a mass of 1.14g at STP, what is the molar mass of fluoromethane?
  - What is the volume occupied by 0.0155 mol of NaCl? (density = 2.17g/mL)
  - If 1.25 L of disilane gas has a mass of 3.47g, what is the molar mass of disilane at STP?
  - What is the molar volume of lithium? (density = 0.534 kg/L)

6. Answer the following questions showing all your work.
- How many atoms are there in 2 molecules of  $\text{Hg}(\text{IO}_3)_2$ ?
  - What is the volume occupied by  $1.45 \times 10^{30}$  molecules of  $\text{COF}_2$  at STP?
  - How many molecules are there in 64.0g of  $\text{FeS}_{(s)}$ ?
  - How many moles are in 25.0mL of  $\text{HCN}_{(g)}$  at STP?
  - What is the volume occupied by 43.5g of  $\text{ClF}_3$  at STP?
  - How many moles are in  $2.75 \times 10^{23}$  atoms of Fe?
  - How many molecules are there in 125mL of  $\text{NOCl}_{(g)}$  at STP?
  - What is the mass of  $3.011 \times 10^{22}$  atoms of Pt?
  - What is the molar mass of  $\text{HClO}_4 \cdot 2\text{H}_2\text{O}$ ?
  - What is the density of  $\text{CH}_2\text{F}_{2(g)}$  at STP?
  - What is the mass of 25.0mL  $\text{Kr}_{(g)}$  at STP?
  - What is the molar volume of iridium metal, Ir? (density = 22.42g/mL)
  - What is the molar mass of 0.0139 mol of a substance having a mass of 0.888g?
  - What is the density of acetic acid,  $\text{CH}_3\text{COOH}$ , if 0.250 mol of  $\text{CH}_3\text{COOH}$  has a volume of 14.3mL?
  - How many moles are in 85.0mg of  $\text{CuSCN}$ ?
  - What is the volume occupied by 0.145 mol of ruby,  $\text{Al}_2\text{O}_3$ , if ruby has a density of 3.97g/mL?
  - What is the molar mass of an atomic particle with a mass of  $9.11 \times 10^{-28}$ g?
  - If 135L of cyanogens has a mass of 313g at STP, what is the molar mass of cyanogens?
  - If the density of  $\text{HgS}$  is 8.10g/mL, how many moles are in a cylinder filled with 50.0mL of  $\text{HgS}$ ?