

Mole - Review

Name - _____

1.) How many atoms are there in each of the following?

a.) 5 molecules of $C_6H_2Cl_4$

b.) 10 molecules of $Co(ClO_4)_2 \cdot 6H_2O$

2.) How many molecules are there in each of the following?

a.) A flask containing 50.0 mL of $NH_3(g)$ at STP

b.) 75.0 g of sugar ($C_{12}H_{22}O_{11}$)

3.) What is the volume occupied by each of the following gases at STP?

a.) 10.0 g of $H_2S(g)$

b.) 8.5×10^{25} molecules of $B_2H_6(g)$

4.) What is the mass of each of the following?

a.) 1 atom of Au

b.) 1.5×10^{15} molecules of AgCl

c.) 250.0 mL of $C_3H_6(g)$ at STP

5.) How many moles are in each of the following?

a.) 5.00 g of $C_{10}H_8$

b.) 1.00 mL of $O_3(g)$ at STP

c.) 4.55×10^{12} atoms Pt

d.) 6.02×10^{16} molecules of PCl_5

6.) What is the molar mass of each of the following?

a.) A protein molecule having a mass of $1.25 \times 10^{-17} g$

b.) 0.179 moles of a substance having a mass of 74.0 g

c.) $Na_2S_2O_3 \cdot 5H_2O$

7a.) What is the molar volume of gold? (density = $19.31 \frac{g}{mL}$)

b.) What is the density of liquid octane, C_8H_{18} if 0.100 moles of octane has a volume of 16.2 mL?

c.) What is the density of $NOCl(g)$ at STP?

d.) What volume is occupied by 0.0875 mol of silver if silver has a density of $10.5 \frac{g}{mL}$?

8a.) How many molecules are there in 64.0 g of $FeS(s)$?

b.) How many moles are in 25.0 mL of HCN (g) at STP?

c.) What is the mass of 3.01×10^{22} atoms of Pt?

9a.) How many molecules are there in 75.0 L of O₃ at STP?

b.) What is the molar mass of a molecule having a mass of 6.23×10^{-22} g?

c.) How many atoms are there in 3 molecules of CH₃COOCH₂CH₃?

d.) If 5.54 mL of carbon oxysulphide gas has a mass of 14.9 mg at STP, what is the molar mass of carbon oxysulphide?

e.) What is the volume of 0.0694 mol of molybdenite, MoS₂, having a density of $4.80 \frac{\text{g}}{\text{mL}}$?

f.) How many molecules are there in 5.00 g of OF₂ (g)?

g.) What is the density of a calcite crystal, CaCO_3 , if 0.0316 mol of CaCO_3 has a volume of 1.167 mL?

10.) Calculate the percentage composition of $(\text{NH}_4)_2\text{Sn}(\text{OH})_6$.

11.) Find the empirical formula for a compound that is 50.5% C, 5.26% H, and 44.2% N.

12.) A gas has an empirical formula CH_2 . If 0.500 L of the gas at STP has a mass of 1.876 g, what is the molecular formula of the compound?

Answers - 1a.) 60 atoms 1b.) 290 atoms 2a.) 1.34×10^{21} molecules 2b.) 1.32×10^{23} molecules 3a.) 6.57 L 3b.) 3200 L or 3.2×10^3 L
4a.) 3.271×10^{-22} g 4b.) 3.6×10^{-7} g 4c.) 0.4698 g 5a.) 0.0391 mol 5b.) 4.46×10^{-5} mol 5c.) 7.56×10^{-12} mol 5d.) 1.00×10^{-7} mol
6a.) $7.53 \times 10^6 \frac{\text{g}}{\text{mol}}$ 6b.) $413 \frac{\text{g}}{\text{mol}}$ 6c.) $248.2 \frac{\text{g}}{\text{mol}}$ 7a.) $98.04 \frac{\text{mol}}{\text{L}}$ 7b.) $705 \frac{\text{g}}{\text{L}}$ 7c.) $2.92 \frac{\text{g}}{\text{L}}$ 7d.) 0.000899 mL 8a.) 4.38×10^{23} molecules
8b.) 0.00112 mol 8c.) 9.75 g 9a.) 2.02×10^{24} molecules 9b.) $375 \frac{\text{g}}{\text{mol}}$ 9c.) 42 atoms 9d.) $60.2 \frac{\text{g}}{\text{mol}}$ 9e.) 23.1 mL 9f.) 5.58×10^{22} molecules
9g.) $2710 \frac{\text{g}}{\text{L}}$ 10.) 10.91% N, 5.505% H, 46.214% Sn, 37.37% O 11.) $\text{C}_4\text{H}_5\text{N}_3$ 12.) C_6H_{12}
5a.) 0.0390 mol 5b.) 4.46×10^{-5} mol