

Chemistry--Unit 3: Chemical Quantities

Practice Problems

I. The Mole: A Measurement of Matter

- 1) What is the gram molecular mass of sucrose ($C_{12}H_{22}O_{11}$)? (342.34 g/mol)
- 2) Calculate the gram formula mass of $KMnO_4$ and $Ca_3(PO_4)_2$.
($KMnO_4 = 158.04$ g/mol, $Ca_3(PO_4)_2 = 310.18$ g/mol)
- 3) How many moles is 3.52×10^{24} molecules of water?

$$3.52 \times 10^{24} \text{ molecules} \times \frac{1 \text{ mole}}{6.02 \times 10^{23} \text{ molecules}} = 5.85 \text{ mol}$$

- 4) How many atoms of zinc are in 0.60 mol of zinc?

$$0.60 \text{ mol Zn} \times \frac{6.02 \times 10^{23} \text{ atoms}}{1 \text{ mol}} = 3.61 \times 10^{23} \text{ atoms}$$

II. Mole-Mass and Mole-Volume Relationships

- 5) Calculate the mass in grams of each of the following.

- a. 8.0 mol lead(II) oxide, (PbO)

$$8.0 \text{ mol PbO} \times \frac{223.2 \text{ g}}{1 \text{ mol}} = 1785.6 \text{ g}$$

- b. 0.75 mol hydrogen sulfide (H_2S)

$$0.75 \text{ mol H}_2\text{S} \times \frac{34.08 \text{ g}}{1 \text{ mol}} = 25.56 \text{ g}$$

- c. 1.50×10^{25} molecules of molecular oxygen (O_2)

$$1.50 \times 10^{25} \text{ molecules} \times \frac{1 \text{ mole}}{6.02 \times 10^{23} \text{ molecules}} \times \frac{32.00 \text{ g}}{1 \text{ mole}} = 797.3 \text{ g}$$

- d. 2.30×10^{30} atoms of iridium

$$2.30 \times 10^{30} \text{ atoms} \times \frac{1 \text{ mole}}{6.02 \times 10^{23} \text{ molecules}} \times \frac{192.22 \text{ g}}{1 \text{ mole}} = 7.34 \times 10^5 \text{ g}$$

- 6) Calculate the number of moles in each of the following.

- a. 0.50 g sodium bromide ($NaBr$)

$$0.50 \text{ g} \times \frac{1 \text{ mole}}{102.89 \text{ g}} = 0.0049 \text{ mol}$$

Chapter 7 Chemical Quantities Worksheet Answers

Léo Pomar



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