

Name: Key

Mole worksheet:

1. How many moles are present in 45.0 liters of HCl gas at STP?

$$45.0 \text{ L} \frac{1 \text{ mole}}{22.4 \text{ L}} = 2.01 \text{ mole}$$

2. What volume does 2.8 moles of CO₂ occupy at STP?

$$2.8 \text{ mol} \frac{22.4 \text{ L}}{1 \text{ mol}} = 62.7 \text{ L}$$

3. How many moles are contained in 0.50 liters of NO₂ gas at STP?

$$0.5 \text{ L} \frac{1 \text{ mol}}{22.4 \text{ L}} = 0.02 \text{ mol}$$

4. How many grams are there in a 2.0 liter flask of CH₄ gas at STP?

$$2.0 \text{ L} \frac{1 \text{ mol}}{22.4 \text{ L}} \frac{16.0 \text{ g}}{1 \text{ mol}} = 0.5 \text{ g}$$

5. What volume does 2.0 g of NO₂ gas occupy at STP?

$$2.0 \text{ g} \frac{1 \text{ mol}}{46.0 \text{ g}} \frac{22.4 \text{ L}}{1 \text{ mol}} = 0.97 \text{ L}$$

6. What is the mass of 100 mL of ethane gas (C₂H₆) at STP?

$$100 \text{ mL} = 0.1 \text{ L} \quad 0.1 \text{ L} \frac{1 \text{ mol}}{22.4 \text{ L}} \frac{30.0 \text{ g}}{1 \text{ mol}} = 0.13 \text{ g}$$

7. What is the mass of 3.0 moles of sulfur?

$$3.0 \text{ mol} \frac{32.0 \text{ g}}{1 \text{ mol}} = 96.3 \text{ g}$$

8. How many moles in 135 grams of sulfur?

$$135 \text{ g} \frac{1 \text{ mol}}{32.0 \text{ g}} = 4.2 \text{ mol}$$

9. What is the mass of 0.350 mole of CO₂?

$$0.350 \text{ mol} \frac{28.0 \text{ g}}{1 \text{ mol}} = 9.8 \text{ g}$$

10. How many moles are there in 34.0 grams of NH₃?

$$34.0 \text{ g} \frac{1 \text{ mol}}{17.0 \text{ g}} = 2 \text{ mol}$$

1. How many atoms are in a 10.0 gram sample of calcium metal?

$$10.0 \text{ g} \frac{1 \text{ mol}}{40.1 \text{ g}} = 0.25 \text{ mol}$$

2. Convert 0.400 mole of water (H₂O) to molecules.

$$0.400 \text{ mol} \frac{18.0 \text{ g}}{1 \text{ mol}} = 7.2 \text{ g}$$

3. Convert 76.0 grams of CaBr₂ to moles.

$$76.0 \text{ g} \frac{1 \text{ mol}}{199.9 \text{ g}} = 0.38 \text{ mol}$$

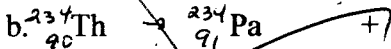
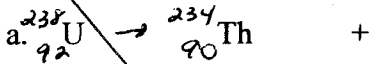
4. Convert 18.0 grams of Ce(CO₃)₃ to moles.

$$18.0 \text{ g} \frac{1 \text{ mol}}{320 \text{ g}} = 0.6 \text{ mol}$$

5. Convert 9.30 moles SiH₄ to grams.

$$9.30 \text{ mol} \frac{32.1 \text{ g}}{1 \text{ mol}} = 298.5 \text{ g}$$

6. Balance the following equations.



7. Write the equation for the following.

a. ${}_{88}^{213}\text{Ra}$ decays by alpha emission

b. ${}_{90}^{231}\text{Th}$ decays by alpha emission

c. ${}_{12}^{27}\text{Mg}$ decays by beta emission

11. How many moles are there in 0.500 g of H_2SO_4 ?

$$0.500 \text{ g} \times \frac{1 \text{ mol}}{98.1 \text{ g}} = 0.005 \text{ mol}$$

12. What is the mass of 0.010 mole of $\text{Ba}(\text{OH})_2$?

$$0.010 \text{ mol} \times \frac{171.3 \text{ g}}{1 \text{ mol}} = 1.7 \text{ g}$$

13. Given the mass of the following determine the following information.

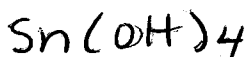
g	$\times \frac{1 \text{ mol}}{\text{molar mass}}$	= Moles of atoms	$\times \frac{6.02 \times 10^{23} \text{ atoms}}{1 \text{ mol}}$	Number of atoms
130 g Zn		<u>1.99 g</u>		<u>1.20×10^{24}</u>
32.5 g Zn		<u>0.49 or 0.50</u>		<u>2.99×10^{23}</u>
18.0 g C		<u>1.5</u>		<u>9.03×10^{23}</u>
4.0 g C		<u>0.33</u>		<u>2.0×10^{23}</u>
21.0 g N_2		<u>0.75</u>		<u>4.5×10^{23}</u>

14. Find the molecular mass for each of the following compounds.

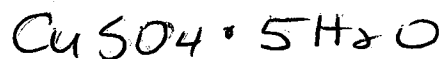
a. Aluminum chloride



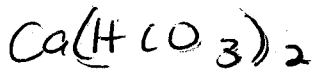
b. Tin (IV) hydroxide



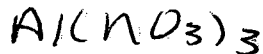
c. Copper (II) sulfate pentahydrate



d. calcium bicarbonate



e. aluminum nitrate



f. magnesium nitride

