

CONTINUING WITH MOLE CALCULATIONS ONE STEP MORE!

1. How many sodium atoms are in 2 moles of sodium carbonate?

$$2 \text{ mol Na}_2\text{CO}_3 \left(\frac{2 \text{ mol Na}}{1 \text{ mol Na}_2\text{CO}_3} \right) \left(\frac{6.02 \times 10^{23} \text{ atoms}}{1 \text{ mol Na}} \right) = 2.41 \times 10^{24} \text{ atoms Na}$$

2. How many sulfur atoms are in 5 moles of hydrosulfuric acid?

$$5 \text{ mol H}_2\text{S} \left(\frac{1 \text{ mol S}}{1 \text{ mol H}_2\text{S}} \right) \left(\frac{6.02 \times 10^{23}}{1 \text{ mol S}} \right) = 3.01 \times 10^{24} \text{ atoms S}$$

3. Calculate the number of atoms of carbon in 2 moles of $\text{C}_{12}\text{H}_{22}\text{O}_{11}$.

$$2 \text{ mol C}_{12}\text{H}_{22}\text{O}_{11} \left(\frac{12 \text{ mol C}}{1 \text{ mol}} \right) \left(\frac{6.02 \times 10^{23}}{1 \text{ mol C}} \right) = 1.45 \times 10^{25} \text{ atoms C}$$

4. How many grams of sodium are in 100 grams of sodium bicarbonate?

$$100 \text{ g NaHCO}_3 \left(\frac{1 \text{ mol}}{84.01 \text{ g}} \right) \left(\frac{1 \text{ mol Na}}{1 \text{ mol NaHCO}_3} \right) \left(\frac{22.99 \text{ g}}{1 \text{ mol Na}} \right) = 27.37 \text{ g Na}$$

5. How many grams of nitrogen are in 25 grams of ammonium sulfate?

$$25 \text{ g (NH}_4)_2\text{SO}_4 \left(\frac{1 \text{ mol}}{132.17 \text{ g}} \right) \left(\frac{2 \text{ mol N}}{1 \text{ mol}} \right) \left(\frac{14.01 \text{ g}}{1 \text{ mol N}} \right) = 5.30 \text{ g}$$

6. How many grams of calcium are in 1000 g of calcium phosphate?

$$1000 \text{ g Ca}_3(\text{PO}_4)_2 \left(\frac{1 \text{ mol}}{310.18 \text{ g}} \right) \left(\frac{3 \text{ mol Ca}}{1 \text{ mol}} \right) \left(\frac{40.08 \text{ g}}{1 \text{ mol Ca}} \right) = 387.65 \text{ g}$$

7. How many grams of carbon are in 3 moles of iron (III) cyanide?

$$3 \text{ mol Fe(CN)}_3 \left(\frac{3 \text{ mol C}}{1 \text{ mol}} \right) \left(\frac{12.01 \text{ g}}{1 \text{ mol C}} \right) = 108.09 \text{ g C}$$

8. How many atoms of oxygen are in 5 moles of copper (I) oxide?

$$5 \text{ mol Cu}_2\text{O} \left(\frac{1 \text{ mol O}}{1 \text{ mol}} \right) \left(\frac{6.02 \times 10^{23} \text{ atoms}}{1 \text{ mol O}} \right) = 3.01 \times 10^{24} \text{ atoms O}$$

9. How many sulfate ions are in 5 moles of aluminum sulfate?

$$5 \text{ mol Al}_2(\text{SO}_4)_3 \left(\frac{3 \text{ mol SO}_4}{1 \text{ mol}} \right) \left(\frac{6.02 \times 10^{23} \text{ ions}}{1 \text{ mol SO}_4} \right) = 9.03 \times 10^{24} \text{ ions SO}_4^{2-}$$

10. How many grams of hydrogen are in 3 moles of water?

$$3 \text{ mol H}_2\text{O} \left(\frac{2 \text{ mol H}}{1 \text{ mol H}_2\text{O}} \right) \left(\frac{1.01 \text{ g}}{1 \text{ mol H}} \right) = 6.06 \text{ g H}$$

11. Calculate the number of atoms of nitrogen in 100 grams of silver nitrate.

$$100 \text{ g AgNO}_3 \left(\frac{1 \text{ mol}}{169.91 \text{ g}} \right) \left(\frac{1 \text{ mol N}}{1 \text{ mol}} \right) \left(\frac{6.02 \times 10^{23}}{1 \text{ mol N}} \right) = 3.54 \times 10^{23} \text{ atoms N}$$

12. Calculate the number of sulfite ions in 14.3 g of chromium (III) sulfite.

$$14.3 \text{ g Cr}_2(\text{SO}_3)_3 \left(\frac{1 \text{ mol}}{344.21 \text{ g}} \right) \left(\frac{3 \text{ mol}}{1 \text{ mol}} \right) \left(\frac{6.02 \times 10^{23}}{1 \text{ mol}} \right) = 8.72 \times 10^{22} \text{ ions SO}_3^{2-}$$

13. How many oxygen atoms are in 10 moles of carbon dioxide?

$$10 \text{ mol CO}_2 \left(\frac{2 \text{ mol O}}{1 \text{ mol CO}_2} \right) \left(\frac{6.02 \times 10^{23}}{1 \text{ mol O}} \right) = 1.2 \times 10^{25} \text{ atoms O}$$

14. How many grams of chlorine are in 75 grams of barium chloride?

$$75 \text{ g BaCl}_2 \left(\frac{1 \text{ mol}}{208.2 \text{ g}} \right) \left(\frac{2 \text{ mol Cl}}{1 \text{ mol}} \right) \left(\frac{35.45 \text{ g}}{1 \text{ mol Cl}} \right) = 25.54 \text{ g Cl}$$

15. How many grams of hydrogen are in 342.34 g of $\text{C}_{12}\text{H}_{22}\text{O}_{11}$?

$$342.34 \text{ g} \left(\frac{1 \text{ mol}}{342.34 \text{ g}} \right) \left(\frac{22 \text{ mol H}}{1 \text{ mol}} \right) \left(\frac{1.01 \text{ g}}{1 \text{ mol H}} \right) = 22.22 \text{ g H}$$

16. How many chlorate ions are in 90 g of potassium chlorate?

$$90 \text{ g KClO}_3 \left(\frac{1 \text{ mol}}{122.55 \text{ g}} \right) \left(\frac{1 \text{ mol ClO}_3}{1 \text{ mol}} \right) \left(\frac{6.02 \times 10^{23}}{1 \text{ mol ClO}_3} \right) = 4.42 \times 10^{23} \text{ ions}$$

17. How many iodine atoms are in 8 moles of calcium iodate?

$$8 \text{ mol Ca(IO}_3)_2 \left(\frac{2 \text{ mol I}}{1 \text{ mol}} \right) \left(\frac{6.02 \times 10^{23}}{1 \text{ mol}} \right) = 9.64 \times 10^{24} \text{ atoms I}$$