ANSWER KEY.

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2-Step Conversions

Chemistry | ANSWER KEY

Go through moles. Chain both conversion factors in one line and round only at the end. Check: particle answers are huge numbers.

1. How many molecules are in 25.0 g of carbon dioxide, CO_2?

25.0 g CO_2 × (1 mol / 44.01 g) × (6.02×10^{23} molecules / 1 mol) = 3.4197×10^{23}

Answer: 3.42×10^{23} molecules CO_2

2. What is the mass of 5.00×10^{23} atoms of aluminum?

5.00×10^{23} atoms × (1 mol / 6.02×10^{23} atoms) × (26.98 g / 1 mol) = 0.83056 mol × 26.98 g/mol = 22.409 g
Answer: 22.4 g Al

3. How many formula units are in 15.0 g of potassium chloride, KCl?

15.0 g KCl × (1 mol / 74.55 g) × (6.02×10^{23} formula units / 1 mol) = 1.2113×10^{23}
Answer: 1.21×10^{23} formula units KCl

4. What is the mass of 2.25×10^{24} molecules of ammonia, NH_3?

2.25×10^{24} molecules × (1 mol / 6.02×10^{23} molecules) × (17.04 g / 1 mol) = 3.7375 mol × 17.04 g/mol = 63.688 g
Answer: 63.7 g NH_3

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5. How many hydrogen atoms are in 0.250 mol of water, H_2O?

0.250 mol H_2O × (6.02 × 10^{23} molecules / 1 mol) × (2 H atoms / 1 molecule) = 3.0100 × 10^{23}

Answer: 3.01 × 10^{23} H atoms (the 2 is an exact count)

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6. How many carbon atoms are in 1.50 mol of propane, C_3H_8?

1.50 mol C_3H_8 × (6.02 × 10^{23} molecules / 1 mol) × (3 C atoms / 1 molecule) = 2.7090 × 10^{24}

Answer: 2.71 × 10^{24} C atoms

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7. A student finds the number of molecules in 9.0 g of water and gets 8.3 × 10^{-25} molecules. Explain how you know this is wrong and what the student did.

Particle answers are huge numbers, not tiny ones. The student divided by 6.02 × 10^{23} instead of multiplying. Correct: 9.0 g × (1 mol / 18.02 g) × (6.02 × 10^{23} / 1 mol) = 3.0 × 10^{23} molecules.

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