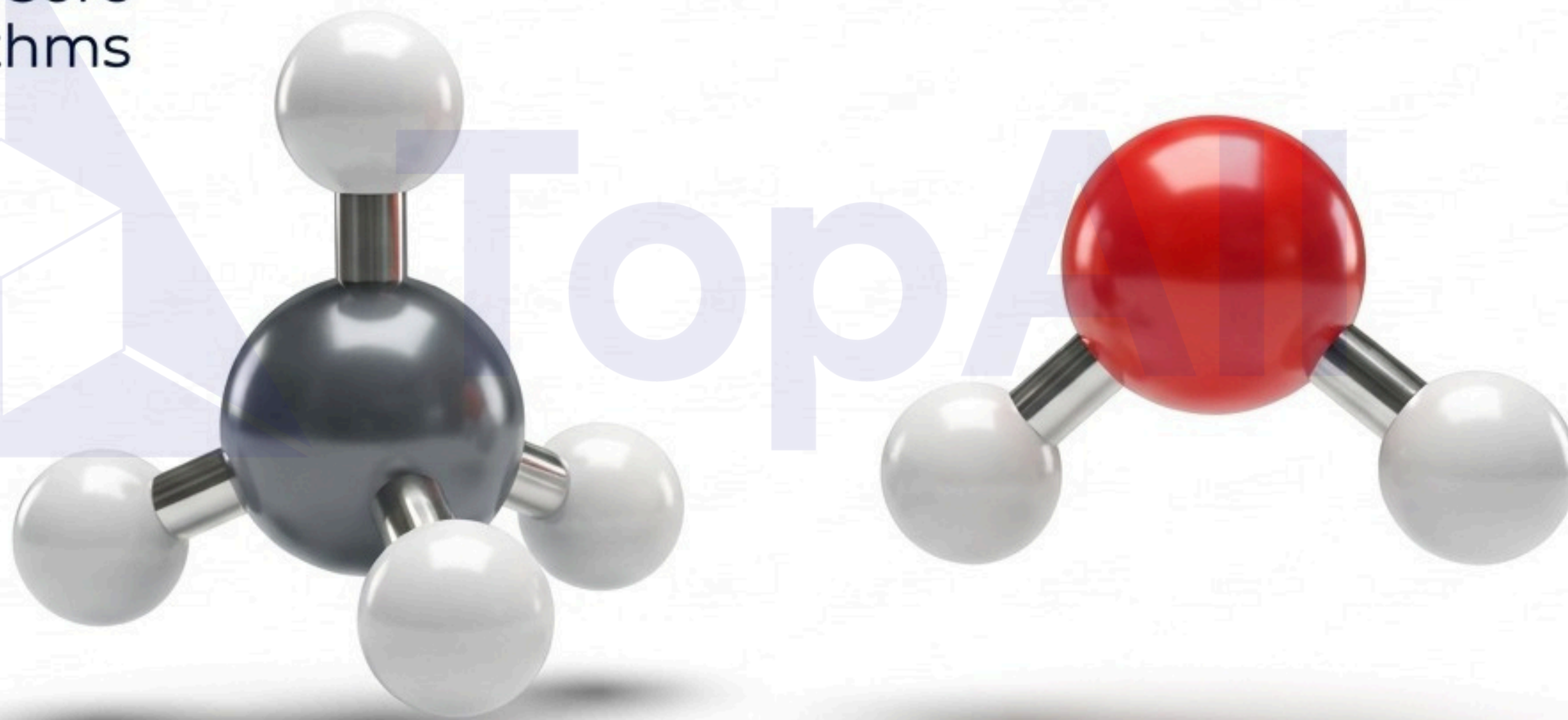


Molecular Mass Calculation

JEE Chemistry Prep: Core
Fundamental Algorithms



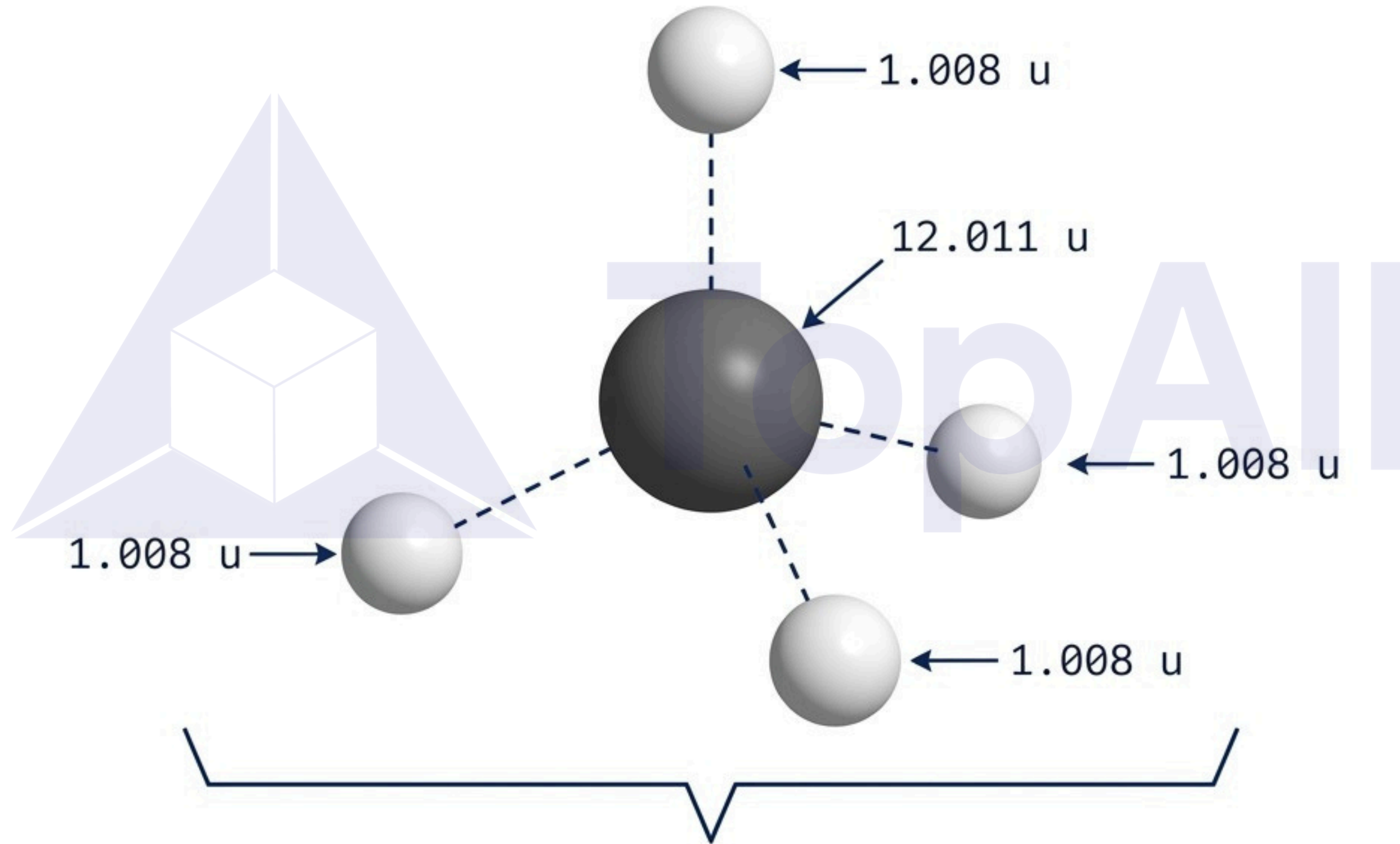
Defining Molecular Mass



$$\text{Molecular Mass} = \sum (\text{Atomic Mass of each element} \times \text{Number of atoms})$$

Masses are expressed in u (unified mass), replacing the older 'amu' standard.

Deconstructing Methane (CH₄)





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$$E=mc^2$$



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The Calculation Standard

$$M(\text{CH}_4) = 12.011 + 4(1.008) = 16.043 \text{ u}$$

Atom count dictates
the multiplier.

$$M(\text{H}_2\text{O}) = 2(1.008) + 16.00 = 18.02 \text{ u}$$

Common Error: Ignoring Subscripts


$$\text{H}_2\text{O mass} = 1.008 + 16.00$$
$$= 17.008 \text{ u}$$



Forgot the 2!
Subscript ignored.


$$\text{H}_2\text{O mass} = 2(1.008) + 16.00$$
$$= 18.02 \text{ u}$$

Subscripts strictly multiply the atomic mass of the element they directly follow.

Exam Application: Glucose ($\text{C}_6\text{H}_{12}\text{O}_6$)

Element	Atoms $\times$ Mass	Subtotal
C	$6 \times 12.011 \text{ u}$	72.066 u
H	$12 \times 1.008 \text{ u}$	12.096 u
O	$6 \times 16.000 \text{ u}$	96.000 u
Total	Total Molecular Mass: 180.162 u	

Execution Algorithm



- 1. COUNT:** Identify every unique element and its precise subscript (the number of atoms). If there is no subscript, the count is 1.
- 2. MULTIPLY & ADD:** Multiply each atom count by its respective atomic mass, then sum all subtotals together.

Execute this matrix flawlessly for every mass calculation.



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