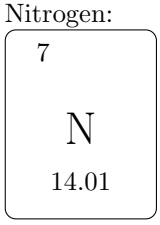
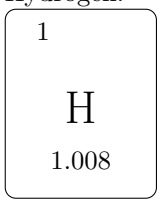
Elements from the Periodic Table

Nitrogen:



Hydrogen:



Calculation of Mass of One Mole

To determine the mass of one mole of a substance, refer to its molar mass, which is typically expressed in grams per mole (g/mol).

1. N_2

Given the atomic mass of Nitrogen (N) as 14.01 g/mol,

$$\begin{aligned} \text{Molar mass of } N_2 &= 2 \times \text{atomic mass of } N \\ &= 2 \times 14.01\,\text{g/mol} \\ &= 28.02\,\text{g/mol} \end{aligned}$$

Thus, 1 mole of N_2 weighs 28.02 grams.

2. H_2

Given the atomic mass of Hydrogen (H) as 1.008 g/mol,

$$\begin{aligned} \text{Molar mass of } H_2 &= 2 \times \text{atomic mass of } H \\ &= 2 \times 1.008\,\text{g/mol} \\ &= 2.016\,\text{g/mol} \end{aligned}$$

Thus, 1 mole of H_2 weighs 2.016 grams.

3. NH_3

$$\begin{aligned}\text{Molar mass of } NH_3 &= \text{atomic mass of } N + 3 \times \text{atomic mass of } H \\ &= 14.01\,\text{g/mol} + 3 \times 1.008\,\text{g/mol} \\ &= 14.01\,\text{g/mol} + 3.024\,\text{g/mol} \\ &= 17.034\,\text{g/mol}\end{aligned}$$

Thus, 1 mole of NH_3 weighs 17.034 grams.