

* Mols, Atoms and Atomic Mass.

1 mol = 6.022×10^{23} atoms = atomic mass of element.

$$\left[\frac{1 \text{ mol}}{6.022 \times 10^{23} \text{ atoms}} \quad \text{OR} \quad \frac{6.022 \times 10^{23} \text{ atoms}}{1 \text{ mol}} \quad \text{OR} \quad \frac{1 \text{ mol}}{\text{at. mass}} \quad \text{OR} \quad \frac{\text{at. mass}}{1 \text{ mol}} \right]$$

① How many molecules are in 5.0×10^{-10} mols of SO_2 .

$$5.0 \times 10^{-10} \text{ mol } \text{SO}_2 \times \frac{6.022 \times 10^{23} \text{ molecules}}{1 \text{ mol}} = \boxed{3.0 \times 10^{14} \text{ molecules}}$$

② How many mols are in 7.0×10^{21} particles of dust?

$$7.0 \times 10^{21} \text{ particles} \times \frac{1 \text{ mol}}{6.022 \times 10^{23} \text{ particles}} = \boxed{1.2 \times 10^{-2} \text{ mol dust}}$$

③ How many mols of Ca^{2+} are in 425 mg of Ca^{2+} tablet?

$$425 \text{ mg} \xrightarrow{\text{mg} \rightarrow \text{g}} \text{g} \xrightarrow{\text{g} \rightarrow \text{mol}} \text{mol} \\ 425 \text{ mg} \times \frac{1 \text{ g}}{1000 \text{ mg}} \times \frac{1 \text{ mol } \text{Ca}^{2+}}{40.08 \text{ g}} = \boxed{0.0106 \text{ mol } \text{Ca}^{2+}}$$

④ How many grams are in 0.462 mols He in a balloon?

$$0.462 \text{ mol He} \times \frac{4.003 \text{ g He}}{1 \text{ mol}} = 1.85 \text{ g He}$$

⑤ How many atoms of Au (gold) are in 62.0 g Au.

$$62.0 \text{ g Au} \xrightarrow{\text{g} \rightarrow \text{mol}} \text{mol} \xrightarrow{\text{mol} \rightarrow \text{atoms}} \text{atoms} \\ 62.0 \text{ g Au} \times \frac{1 \text{ mol}}{196.97 \text{ g}} \times \frac{6.022 \times 10^{23} \text{ atoms}}{1 \text{ mol}} = 1.896 \times 10^{23} \\ = \boxed{1.90 \times 10^{23} \text{ atoms}}$$