The Mole Concept

Independent Practice

1. How many atoms of hydrogen are present in a 4.10 mole sample of pentacarbon decahydride?

$$4.10\ \text{mol}\ C_5H_{10} \times \frac{10\ \text{mol H}}{1\ \text{mol}\ C_5H_{10}} \times \frac{6.02\times10^{23}\ \text{a H}}{1\ \text{mol H}} = \boxed{2.47\times10^{25}\ \text{a H}}$$

2. How many moles of chlorate ions are in a sample containing 7.3×10^{23} formula units of magnesium chlorate?

$$7.3\times10^{23}\ \text{Fu}\ Mg(ClO_3)_2 \times \frac{1\ \text{mol}\ Mg(ClO_3)_2}{6.02\times10^{23}\ \text{Fu}\ Mg(ClO_3)_2} \times \frac{2\ \text{mol}\ ClO_3}{1\ \text{mol}\ Mg(ClO_3)_2} = \boxed{2.4\ \text{mol}\ ClO_3}$$

3. How many moles of hydroxide ions, OH^-, are in 2.1×10^{24} formula units of $Al(OH)_3$?

$$2.1\times10^{24}\ \text{FU}\ Al(OH)_3 \times \frac{1\ \text{mol}\ Al(OH)_3}{6.02\times10^{23}\ \text{FU}\ Al(OH)_3} \times \frac{3\ \text{mol}\ OH^-}{1\ \text{mol}} = \boxed{10.\ \text{mol}\ OH^-}$$

4. How many sulfate ions are in 1.1 moles of aluminum sulfate?

$$1.1\ \text{mol}\ Al_2(SO_4)_3 \times \frac{3\ \text{mol}\ SO_4^{2-}}{1\ \text{mol}\ Al_2(SO_4)_3} = \boxed{3.3\ \text{mol}\ SO_4^{2-}}$$

5. How many moles of glucose, $C_6H_{12}O_6$, contain 1.84×10^{24} atoms of hydrogen?

$$1.84\times10^{24}\ \text{a H} \times \frac{1\ \text{mol H}}{6.02\times10^{23}\ \text{a H}} \times \frac{1\ \text{mol}\ C_6H_{12}O_6}{12\ \text{mol H}} = \boxed{.255\ \text{mol}\ C_6H_{12}O_6}$$