Problem Set Chapter 3

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September 10, 2020

1. How many moles are in the following:
   (a) $Zn(NO_3)_2 \rightarrow 189[\text{g mol}^{-1}] \rightarrow \frac{38.7[\text{g}]}{189[\text{g mol}^{-1}]} = .205[\text{mol}]$
   (b) $HNO_3 \rightarrow 63[\text{g mol}^{-1}] \rightarrow \frac{40.2[\text{g}]}{63[\text{g mol}^{-1}]} = .638[\text{mol}]$
2. How many grams are in the following:
   (a) $CaCr_2O_7 \rightarrow 256[\text{g mol}^{-1}] \rightarrow 2.36[\text{mol}] \cdot 256[\text{g mol}^{-1}] \rightarrow 604[\text{g}]$
   (b) $Na_2CO_3 \rightarrow 106[\text{g mol}^{-1}] \rightarrow .058[\text{mol}] \cdot 106[\text{g mol}^{-1}] \rightarrow 6.148[\text{g}]$
3. How many molecules are in the following:
   (a) $H_2SO_4 \rightarrow 98[\text{g mol}^{-1}] \rightarrow \frac{23600[\text{g}]}{98[\text{g mol}^{-1}]} = 240.816[\text{mol}] \cdot 6.022 \cdot 10^{23} = 1.45 \cdot 10^{26}[\text{molecules}]$
   (b) $H_2O \rightarrow 18[\text{g mol}^{-1}] \rightarrow \frac{100[\text{g}]}{18[\text{g mol}^{-1}]} = 5.56[\text{mol}] \cdot 6.022 \cdot 10^{23} = 3.346 \cdot 10^{24}[\text{molecules}]$
4. How many grams of oxygen are in the following:
   (a) $Na_2S_2O_3 \rightarrow \frac{48[\cancel{g}]}{158[\cancel{g}]} = .304 \cdot 6.36[\text{g}] = 1.933[\text{g}]$
   (b) $Na_2Fe(CO)_4 \rightarrow \frac{64[\cancel{g}]}{214[\cancel{g}]} = .3 \cdot 855[\text{g}] = 256.5[\text{g}]$