

**Problem Set One: Episode 701—KEY**

How many atoms are in 3.5 grams of silicon?

$$? \text{ atoms Si} = 3.5 \text{ g Si} \times \frac{1 \text{ mole Si}}{28.1 \text{ g Si}} \times \frac{6.02 \times 10^{23} \text{ atoms Si}}{1 \text{ mole Si}} = 7.5 \times 10^{22} \text{ atoms Si}$$

How many formula units are in  
32.6 grams of potassium oxide?

$$? \text{ f.u. } K_2O = 32.6 \text{ g } K_2O \times \frac{1 \text{ mole } K_2O}{94.2 \text{ g } K_2O} \times \frac{6.02 \times 10^{23} \text{ f.u. } K_2O}{1 \text{ mole } K_2O} = 2.08 \times 10^{23} \text{ f.u. } K_2O$$

How many molecules are in  
0.25 grams of dinitrogen pentoxide?

$$\begin{aligned} ? \text{ molecules } N_2O_5 &= 0.25 \text{ g } N_2O_5 \times \frac{1 \text{ mole } N_2O_5}{108.0 \text{ g } N_2O_5} \times \frac{6.02 \times 10^{23} \text{ molecules } N_2O_5}{1 \text{ mole } N_2O_5} \\ &= 1.4 \times 10^{21} \text{ molecules } N_2O_5 \end{aligned}$$