Molar Mass Buffet Lab

Name Key

Block ____ Date ________

Go to each station and perform the conversion requested. Show all of your work below.

1) How many atoms of Al are in the piece of aluminum foil?

$$0.47 \text{ g Al} \left(\frac{1 \text{ mol}}{26.98 \text{ g}}\right)\left(\frac{6.02 \times 10^{23} \text{ atoms}}{1 \text{ mol}}\right) = \boxed{1.0 \times 10^{22} \text{ Al atoms}}$$

2) Assuming the penny is 100% copper, how many moles of Cu are in the penny?

$$2.50 \text{ g Cu} \left(\frac{1 \text{ mol}}{63.55 \text{ g}}\right) = \boxed{0.393 \text{ mol Cu}}$$

3) If this piece of zinc contains 4.74×10^{22} atoms of Zn, how much does it weigh?

$$4.74 \times 10^{22} \text{ atoms Zn} \left(\frac{1 \text{ mol}}{6.02 \times 10^{23} \text{ atoms}}\right)\left(\frac{65.38 \text{ g}}{1 \text{ mol}}\right) = \boxed{5.15 \text{ g Zn}}$$

4) This sample of CuSO4 weighs 3.02g. How many moles does that equal?

$$3.02 \text{ g } CuSO_4 \left(\frac{1 \text{ mol}}{159.61 \text{ g}}\right) = \boxed{0.0189 \text{ mol } CuSO_4}$$

5) Measure out 10.0 grams of H_2O. How many molecules are now present in the beaker?

$$10.0 \text{ g } H_2O \left(\frac{1 \text{ mol}}{18.02 \text{ g}}\right)\left(\frac{6.02 \times 10^{23} \text{ molec}}{1 \text{ mol}}\right) = \boxed{3.34 \times 10^{23} \ H_2O \text{ molecules}}$$

6) This is a 2.87g sample of glucose ($C_6H_{12}O_6$). How many oxygen atoms are present in the sample?

$$2.87\text{ g } C_6H_{12}O_6 \left(\frac{1\text{ mol}}{180.16\text{ g}}\right)\left(\frac{6.02\times10^{23}\text{ molec}}{1\text{ mol}}\right)\left(\frac{6\text{ O atoms}}{1\text{ molec}}\right) = \boxed{5.75\times10^{22}\text{ O atoms}}$$

7) In the weigh boat are 3.4×10^{22} molecules of ribose ($C_5H_{10}O_5$). How much does the sample weigh in grams?

$$3.4\times10^{22}\text{ molec } C_5H_{10}O_5 \left(\frac{1\text{ mol}}{6.02\times10^{23}\text{ molec}}\right)\left(\frac{150.13\text{ g}}{1\text{ mol}}\right) = \boxed{8.5\text{ g } C_5H_{10}O_5}$$

8) How many molecules of salt ($CaCl_2$) are in a new bag of Morton's sidewalk salt?

$$18.1\text{ kg}\left(\frac{1000\text{ g}}{1\text{ kg}}\right)\left(\frac{1\text{ mol}}{110.98\text{ g}}\right)\left(\frac{6.02\times10^{23}\text{ molec}}{1\text{ mol}}\right) = \boxed{9.82\times10^{25}\text{ molec } CaCl_2}$$

9) This sandstone rock is nearly all calcium carbonate ($CaCO_3$). Weigh it and figure out how many molecules of $CaCO_3$ are in the rock.

$$15.31\text{ g } CaCO_3 \left(\frac{1\text{ mol}}{100.09\text{ g}}\right)\left(\frac{6.02\times10^{23}\text{ molec}}{1\text{ mol}}\right) = \boxed{9.208\times10^{22}\ CaCO_3\text{ molecules}}$$

10) Measure out 1.05×10^{21} molecules of baking soda ($NaHCO_3$).

$$1.05\times10^{21}\text{ molecules } NaHCO_3 \left(\frac{1\text{ mol}}{6.02\times10^{23}\text{ molec}}\right)\left(\frac{84.01\text{ g}}{1\text{ mol}}\right) = \boxed{0.147\text{ g } NaHCO_3}$$