

98.2 g of calcium. How many moles of calcium? How many atoms of calcium?

molar mass (atomic mass) of calcium = 40.078 g

$$98.2 \cancel{\text{g Ca}} * \frac{1 \text{ mol Ca}}{40.078 \cancel{\text{g Ca}}} = \boxed{2.45 \text{ mol Ca}}$$

Avagadro's Number

$$98.2 \text{ g Ca} * \frac{1 \text{ mol Ca}}{40.078 \text{ g Ca}} * \frac{6.022 * 10^{23} \text{ atoms}}{1 \text{ mol Ca}} = \boxed{1.476 * 10^{24} \text{ atoms}}$$

6.78 moles barium (Ba)

mass of barium? atoms of barium?

Molar mass of barium: 137.33g

Mass of Barium (g)

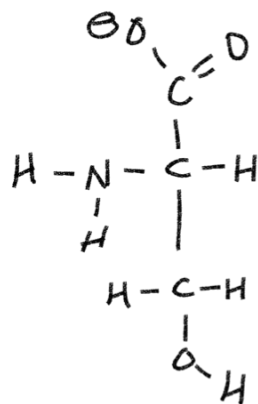
$$6.78 \cancel{\boxed{\text{mol Ba}}} * \frac{137.33 \text{ g Ba}}{1 \cancel{\boxed{\text{mol Ba}}}} = \boxed{931 \text{ g Ba}}$$

Atoms of Barium (atoms)

$$6.78 \cancel{\text{ mol Ba}} * \frac{6.022 * 10^{23} \text{ atom Ba}}{1 \cancel{\text{ mol Ba}}} = \boxed{4.08 * 10^{24} \text{ atoms}}$$

Serine $C_3H_7NO_3$

Find molar mass.



$$C: 3 * 12.011 \frac{g}{mol} = 36.033 \frac{g}{mol}$$

$$H: 7 * 1.008 \frac{g}{mol} = 7.056 \frac{g}{mol}$$

$$N: 1 * 14.007 \frac{g}{mol} = 14.007 \frac{g}{mol}$$

$$O: 3 * 15.999 \frac{g}{mol} = 47.997 \frac{g}{mol}$$

$$\boxed{105.093 \frac{g}{mol}}$$

Glutamine $C_5H_{10}N_2O_3$ Find molar mass

$$C: 5 * 12.011 \frac{g}{mol} = 60.055 \frac{g}{mol}$$

$$H: 10 * 1.008 \frac{g}{mol} = 10.08 \frac{g}{mol}$$

$$N: 2 * 14.007 \frac{g}{mol} = 28.014 \frac{g}{mol}$$

$$O: 3 * 15.999 \frac{g}{mol} = 47.997 \frac{g}{mol}$$

$$\boxed{146.146 \frac{g}{mol}}$$

How many moles in 454 g of $C_6H_{12}O_6$

Find molar mass

$$C: 6 * 12.011 \text{ g/mol} = 72.066 \text{ g/mol}$$

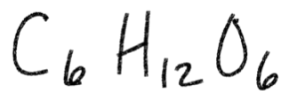
$$H: 12 * 1.008 \text{ g/mol} = 12.096 \text{ g/mol}$$

$$O: 6 * 15.999 \text{ g/mol} + 95.994 \text{ g/mol}$$

$$180.156 \text{ g/mol}$$

$$454 \text{ g } C_6H_{12}O_6 * \frac{1 \text{ mol } C_6H_{12}O_6}{180.156 \text{ g } C_6H_{12}O_6} = \boxed{2.52 \text{ mol}}$$

Percent Composition
(by mass)



% C % H % O

Molar Mass of $C_6H_{12}O_6$: $\boxed{180.156 \text{ g/mol}}$

Contribution of each element

$$C: 6 * 12.011 \text{ g/mol} = \frac{72.066 \text{ g/mol} * 100\%}{\boxed{180.156}} = 40.0\%$$

$$H: 12 * 1.008 \text{ g/mol} = \frac{12.096 \text{ g/mol} * 100\%}{\boxed{180.156}} = 6.7\%$$

$$O: 6 * 15.999 \text{ g/mol} + 95.994 \text{ g/mol} = \frac{95.994 \text{ g/mol} * 100\%}{\boxed{180.156}} = 53.3\%$$

Percent Composition Serine $C_3H_7NO_3$

$$C: 3 * 12.011 \frac{g}{mol} = 36.033 \frac{g}{mol}$$

$$\%C = \frac{36.033}{105.093} * 100\%$$

$$34.3\%$$

$$H: 7 * 1.008 \frac{g}{mol} = 7.056 \frac{g}{mol}$$

$$\%H = \frac{7.056}{105.093} * 100\%$$

$$6.7\%$$

$$N: 1 * 14.007 \frac{g}{mol} = 14.007 \frac{g}{mol}$$

$$\%N = \frac{14.007}{105.093} * 100\%$$

$$13.3\%$$

$$O: 3 * 15.999 \frac{g}{mol} = 47.997 \frac{g}{mol}$$

$$\%O = \frac{47.997}{105.093} * 100\%$$

$$45.7\%$$

$$105.093 \frac{g}{mol}$$

$$45.7\%$$