Thursday:

a) 3 $\text{mol}I_2$ $\dfrac{(1126.9g)\cdot 2}{1mol I_2}$ more than 1 gram

b) Amount of potassium containing 5×10^{50} more than 1 gram

$$5\times 10^{50}\ \text{electrons}\ \frac{1Katom}{19e^-}\ \frac{1molK}{6.002\cdot 10^{23}atoms}\ \frac{39.1g}{1molK}$$

c) **6 × 10^{15} u of Ba** $\dfrac{\dfrac{1}{6.022\cdot 10^{23}}g}{1u} = \dfrac{6\cdot 10^{15}}{6.022\cdot 10^{23}}g$ **less than 1 gram**

1. (3points) How many moles of hydrated ions are formed when 0.1 mol of calcium carbonate completely dissolves in water?

    1 mol of $CaCO_3$: 1mol of Ca^{2+} and 1 mol of CO_3^{2-}

    $$0.1molCaCO_3\ \frac{2molIons}{1molCaCO_3} = 0.2mol$$

    <div style="border:1px solid">

    ions = 0.2 mol

    </div>

2. A protein molecule has mass 12,000 u.

    a. (2 points) Calculate the molar mass of the protein. Express your answer to the correct number of significant figures.

    <div style="border:1px solid">

    Molar mass $= 12{,}000g/mol$

    </div>

    $$12{,}000\ \text{u}\cdot\frac{\frac{1}{6.022\cdot 10^{23}}g}{1u} = \frac{12000}{6.022\cdot 10^{23}}g\cdot\frac{N_A}{mol} = \frac{12000}{6.022\cdot 10^{23}}g\cdot\frac{6.022\cdot 10^{23}}{mol} = 12000\frac{g}{mol}$$

    b. (3points) Calculate the mass of the single protein. Express your answer to the correct number of significant figures.

    $$12{,}000\ \text{u}\cdot\frac{\frac{1}{6.022\cdot 10^{23}}g}{1u} = 2.0\cdot 10^{-20}g$$

    <div style="border:1px solid">

    mass $= 2.0\times 10^{-20}$ g

    </div>

Friday

1. (2 points) For the following circle the one with the lightest mass?

    a) 10 mol Br_2 more than 1 gram

    d) Amount of calcium containing 5×10^{50} electrons   more than 1 gram

    e) <u>6×10^{15} u of Cs</u> $\dfrac{\frac{1}{6.022 \cdot 10^{23}} g}{1u} = \dfrac{6 \cdot 10^{15}}{6.022 \cdot 10^{23}} g$ less than 1 gram

2. (3points) How many moles of hydrated ions are formed when 0.1 mol of sodium nitrate completely dissolves in water?

    1 mol of $NaNO_3$: 1mol of Na^+ and 1 mol of CO_3^{2-}

    0.1 mol $NaNO_3 \dfrac{2mols\ of\ Ions}{1mol\ NaNO3} = 0.2mols$

    $\boxed{\text{ions} = 0.2 \text{ mol}}$

3. A protein molecule has mass 18,000 u.

    c. (2 points) Calculate the molar mass of the protein. Express your answer to the correct number of significant figures.

    $18000u \times \dfrac{\frac{1}{6.022140857}g}{1u} \times \dfrac{6.022140857}{1mol} = 18000 \dfrac{g}{mol}$

    $\boxed{\text{Molar mass} = 18{,}000 \text{ g/mol}}$

    d. (3points) Calculate the mass of the single protein. Express your answer to the correct number of significant figures.

    $18000u \times \dfrac{\frac{1}{6.022140857}g}{1u} = 2.9 \times 10^{-20}$ g

    $\boxed{\text{mass} = 2.9 \times 10^{-20} \text{ g}}$