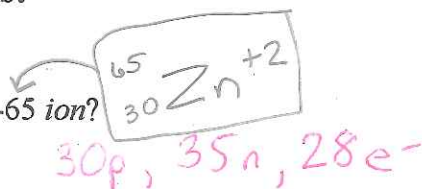


AP Assorted Review Problems:
Ch1-4

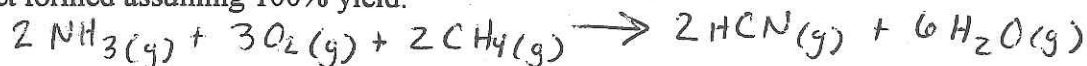
1. How many p, n, e in the zinc-65 ion?



2. Balance the equation in an acidic solution:



3. Hydrogen Cyanide is produced industrially from the following reaction. If 5.00×10^3 kg of each reactant is mixed together, determine the mass of each product formed assuming 100% yield.



4. A compound contains only carbon, hydrogen, nitrogen, and oxygen. Combustion of 0.157 g of the compound produced 0.213 g of CO_2 , and 0.0310 g of water. In another experiment, it is found that the compound produces 0.0230 g of NH_3 . What is the empirical formula for the compound?

0.103 g of

5. What is the concentration of aluminum ions in a 0.15 M aluminum sulfate solution?
6. Write the net ionic equation for the reaction between lead(II)nitrate and hydrochloric acid.
7. Write the net ionic equation for the reaction between acetic acid and a solution of barium hydroxide.
8. Assign oxidation states to each atom in $\text{Mg}_2\text{P}_2\text{O}_7$.

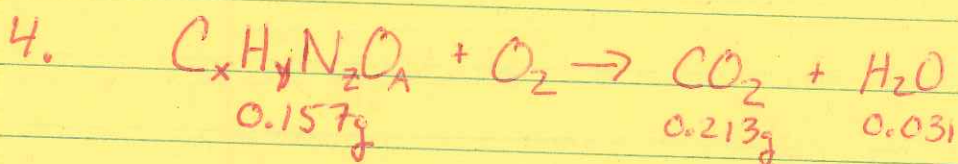
$$3. \quad 5.00 \times 10^3 \text{ kg NH}_3 \times \frac{1000 \text{ g NH}_3}{1 \text{ kg}} \times \frac{1 \text{ mol NH}_3}{17.0 \text{ g NH}_3} \times \frac{2 \text{ mol HCN}}{2 \text{ mol NH}_3} \times \frac{27.0 \text{ g HCN}}{1 \text{ mol HCN}} = 7941 \text{ kg}$$

$$5.00 \times 10^3 \text{ kg O}_2 \times \frac{1000 \text{ g O}_2}{1 \text{ kg}} \times \frac{1 \text{ mol O}_2}{32.0 \text{ g O}_2} \times \frac{2 \text{ mol HCN}}{3 \text{ mol O}_2} \times \frac{27.0 \text{ g HCN}}{1 \text{ mol HCN}} = 2812 \text{ kg HCN}$$

$$5.00 \times 10^3 \text{ kg CH}_4 \times \frac{1000 \text{ g CH}_4}{1 \text{ kg}} \times \frac{1 \text{ mol CH}_4}{16.0 \text{ g CH}_4} \times \frac{2 \text{ mol HCN}}{2 \text{ mol CH}_4} \times \frac{27.0 \text{ g HCN}}{1 \text{ mol HCN}} = 8437 \text{ kg HCN}$$

Limiting is O₂

$$5.00 \times 10^3 \text{ kg O}_2 \times \frac{1000 \text{ g O}_2}{1 \text{ kg}} \times \frac{1 \text{ mol O}_2}{32.0 \text{ g O}_2} \times \frac{6 \text{ mol H}_2\text{O}}{3 \text{ mol O}_2} \times \frac{18.0 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} = 5625 \text{ g H}_2\text{O}$$



$$0.157 \text{ g} \qquad \qquad \qquad 0.213 \text{ g} \qquad 0.031$$

$$\text{mass of C} = 0.213 \text{ g CO}_2 \times \frac{12.0 \text{ g C}}{44.0 \text{ g CO}_2} = 0.0581 \text{ g C} = 37.0\% \text{ C}$$

$$\text{mass of H} = 0.0310 \text{ g H}_2\text{O} \times \frac{2.0 \text{ g H}}{18.0 \text{ g H}_2\text{O}} = 0.00344 \text{ g H} = 2.19\% \text{ H}$$

$$\text{mass of N} = 0.103 \text{ g NH}_3 \times \frac{14.0 \text{ g N}}{17.0 \text{ g NH}_3} = 0.0189 \text{ g N} = 18.3\% \text{ N}$$

$$\% O = 42.51\% O$$

$$37.0 \text{ g C} \times \frac{1 \text{ mol}}{12.0 \text{ g}} = 3.08 \frac{\text{mol}}{1.31} = 2.35 \text{ mol C} \times 3 = 7$$

$$2.19 \text{ g H} \times \frac{1 \text{ mol}}{1.01 \text{ g}} = 2.17 \frac{\text{mol}}{1.31} = 1.66 \text{ mol H} \times 3 = 5$$

$$18.3 \text{ g N} \times \frac{1 \text{ mol}}{14.0 \text{ g}} = 1.31 \frac{\text{mol}}{1.31} = 1 \text{ mol N} \times 3 = 3$$

$$42.51 \text{ g O} \times \frac{1 \text{ mol}}{16.0 \text{ g}} = 2.65 \frac{\text{mol}}{1.31} = 2 \text{ mol O} \times 3 = 6$$

