

3d.) In combustion reaction where 133 milligrams of octane gas, C_8H_{18} , reacts with oxygen gas to produce the products of a combustion reaction. Calculate the mass (in grams) of water gas created from this reaction.



$$\frac{133 \text{ mg}}{10^3 \text{ mg}} \left| \frac{1 \text{ g}}{10^3 \text{ mg}} \right| \frac{1 \text{ mol } C_8H_{18}}{114.224 \text{ g}} \left| \frac{18 \text{ mol } H_2O}{2 \text{ mol } C_8H_{18}} \right| \frac{18.016 \text{ g}}{1 \text{ mol } H_2O}$$

$$= 0.189 \text{ g } H_2O$$

3e.) In a synthesis reaction, aluminum reacts with 1.53 kilograms of oxygen gas. Calculate the mass of the product aluminum oxide in grams.



$$\frac{1.53 \text{ kg } O_2}{1 \text{ kg}} \left| \frac{10^3 \text{ g}}{1 \text{ kg}} \right| \frac{1 \text{ mol } O_2}{32 \text{ g}} \left| \frac{2 \text{ mol } Al_2O_3}{3 \text{ mol } O_2} \right| \frac{101.96 \text{ g}}{1 \text{ mol } Al_2O_3}$$

$$= 3.25 \times 10^3 \text{ g } Al_2O_3$$