

Stoichiometry Practice Problems-Worksheet One

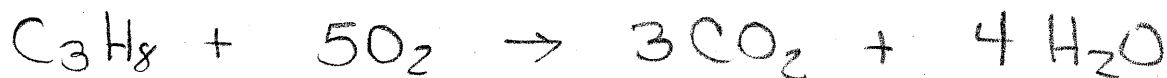
1. Pentane burns in the presence of oxygen to produce carbon dioxide and water. If you have 3.0 moles of pentane and excess oxygen, how many moles of each product can you form?



$$\frac{3.0 \text{ mol C}_5\text{H}_{12}}{1 \text{ mol C}_5\text{H}_{12}} \left| \frac{5 \text{ mol CO}_2}{1 \text{ mol C}_5\text{H}_{12}} \right. = \boxed{15 \text{ mol CO}_2}$$

$$\frac{3.0 \text{ mol C}_5\text{H}_{12}}{1 \text{ mol C}_5\text{H}_{12}} \left| \frac{6 \text{ mol H}_2\text{O}}{1 \text{ mol C}_5\text{H}_{12}} \right. = \boxed{18 \text{ mol H}_2\text{O}}$$

2. If you have 88 grams of propane and excess oxygen, how many moles of each product can you form? (Assume complete combustion)

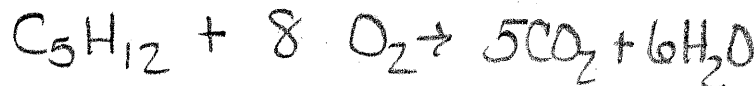


$$\frac{88 \text{ grams C}_3\text{H}_8}{44.11 \text{ g C}_3\text{H}_8} \left| \frac{1 \text{ mol C}_3\text{H}_8}{44.11 \text{ g C}_3\text{H}_8} \right. = \boxed{2.0 \text{ mol C}_3\text{H}_8}$$

$$\frac{2.0 \text{ mol C}_3\text{H}_8}{1 \text{ mol C}_3\text{H}_8} \left| \frac{3 \text{ mol CO}_2}{1 \text{ mol C}_3\text{H}_8} \right. = \boxed{6.0 \text{ mol CO}_2}$$

$$\frac{2.0 \text{ mol C}_3\text{H}_8}{1 \text{ mol C}_3\text{H}_8} \left| \frac{4 \text{ mol H}_2\text{O}}{1 \text{ mol C}_3\text{H}_8} \right. = \boxed{8.0 \text{ mol H}_2\text{O}}$$

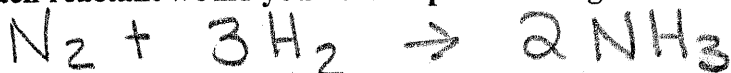
3. If you have 245 grams of pentane how many grams of oxygen are needed to react completely with this amount of pentane?



$$\frac{245 \text{ g C}_5\text{H}_{12}}{72.17 \text{ g C}_5\text{H}_{12}} = 3.39 \text{ mol C}_5\text{H}_{12}$$

$$\frac{3.39 \text{ mol C}_5\text{H}_{12}}{1 \text{ mol C}_5\text{H}_{12}} \left| \frac{8 \text{ mol O}_2}{1 \text{ mol C}_5\text{H}_{12}} \right. \left| \frac{32.00 \text{ g O}_2}{1 \text{ mol O}_2} \right. = \boxed{868 \text{ g O}_2}$$

4. If you react hydrogen and nitrogen gas to produce ammonia gas (NH₃)
How many grams of each reactant would you need to produce 85 grams of ammonia?



$$\frac{85\text{g NH}_3}{17.04\text{g NH}_3} \left| \frac{1\text{mol NH}_3}{2\text{mol NH}_3} \right. = 5.0\text{ mol NH}_3$$

$$\frac{5.0\text{ mol NH}_3}{2\text{mol NH}_3} \left| \frac{1\text{mol N}_2}{2\text{mol NH}_3} \right. \left| \frac{28.02\text{g N}_2}{1\text{mol N}_2} \right. = 7.0 \times 10^1 \text{g}$$

$$\frac{5.0\text{ mol NH}_3}{2\text{mol NH}_3} \left| \frac{3\text{mol H}_2}{2\text{mol NH}_3} \right. \left| \frac{2.02\text{g H}_2}{1\text{mol H}_2} \right. = 15\text{g H}_2$$

5. If you have 6 moles of strontium and 4 moles of oxygen, how many moles of strontium oxide can you form?



$$\frac{6\text{ mol Sr}}{2\text{ mol Sr}} \left| \frac{2\text{ mol SrO}}{2\text{ mol Sr}} \right. = 6\text{ mol SrO}$$

$$\frac{4\text{ mol O}_2}{1\text{ mol O}_2} \left| \frac{2\text{ mol SrO}}{2\text{ mol SrO}} \right. = 8\text{ mol SrO}$$

∴ you can only make 6 mol SrO

6. If you want to form 100.0 grams of Iron III sulfide, how many grams of iron will you need?



$$\frac{100.0\text{g Fe}_2\text{S}_3}{207.9\text{g}} \left| \frac{1\text{mol Fe}_2\text{S}_3}{2\text{mol Fe}} \right. \left| \frac{55.85\text{g Fe}}{1\text{mol Fe}} \right.$$

$$= 53.73\text{g Fe}$$