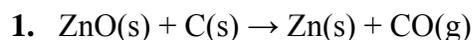


Limiting Reactant Problems

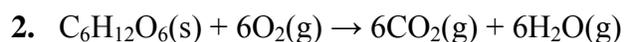
Answer Key



$$17.2 \text{ mol ZnO} \times \frac{1 \text{ mol Zn}}{1 \text{ mol ZnO}} = 17.2 \text{ mol Zn(s)}$$

$$43.2 \text{ mol C} \times \frac{1 \text{ mol Zn}}{1 \text{ mol C}} = 43.2 \text{ mol Zn(s)}$$

Zinc oxide is the limiting reactant.



$$5.55 \text{ mol C}_6\text{H}_{12}\text{O}_6 \times \frac{6 \text{ mol CO}_2}{1 \text{ mol C}_6\text{H}_{12}\text{O}_6} = 33.3 \text{ mol CO}_2\text{(g)}$$

$$34.0 \text{ mol O}_2 \times \frac{6 \text{ mol CO}_2}{6 \text{ mol O}_2} = 34.0 \text{ mol CO}_2\text{(g)}$$

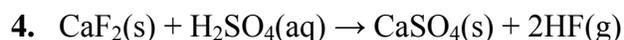
Glucose is the limiting reactant. This seems reasonable because oxygen is quite often in abundance.



$$126 \text{ g C}_3\text{H}_6 \times \frac{\text{mol}}{42.09 \text{ g}} \times \frac{4 \text{ mol C}_3\text{H}_3\text{N}}{4 \text{ mol C}_3\text{H}_6} = 2.99 \text{ mol C}_3\text{H}_3\text{N(g)}$$

$$175 \text{ g NO} \times \frac{\text{mol}}{30.01 \text{ g}} \times \frac{4 \text{ mol C}_3\text{H}_3\text{N}}{6 \text{ mol NO(g)}} = 3.89 \text{ mol NO(g)}$$

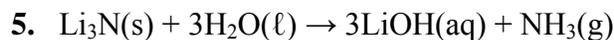
C_3H_6 is the limiting reactant.



$$10.0 \text{ g CaF}_2 \times \frac{\text{mol}}{78.08 \text{ g}} \times \frac{1 \text{ mol CaSO}_4}{1 \text{ mol CaF}_2} = 0.128 \text{ mol CaSO}_4\text{(s)}$$

$$15.5 \text{ g H}_2\text{SO}_4 \times \frac{\text{mol}}{98.09 \text{ g}} \times \frac{1 \text{ mol CaSO}_4}{1 \text{ mol H}_2\text{SO}_4} = 0.158 \text{ mol CaSO}_4\text{(s)}$$

Calcium fluoride is the limiting reactant.



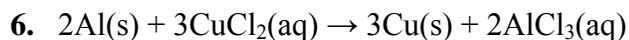
$$4.87 \text{ g Li}_3\text{N} \times \frac{\text{mol}}{34.83 \text{ g}} \times \frac{1 \text{ mol NH}_3}{1 \text{ mol Li}_3\text{N}} = 0.140 \text{ mol NH}_3\text{(g)}$$

$$7.74 \text{ g H}_2\text{O} \times \frac{\text{mol}}{18.02 \text{ g}} \times \frac{1 \text{ mol NH}_3}{3 \text{ mol H}_2\text{O}} = 0.143 \text{ mol NH}_3\text{(g)}$$

Lithium nitride is the limiting reactant.

Limiting Reactant Problems

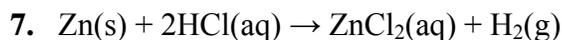
Answer Key (continued)



$$0.25 \text{ g Al} \times \frac{\text{mol}}{26.98 \text{ g}} \text{ Al} \times \frac{2 \text{ mol AlCl}_3}{2 \text{ mol Al}} = 9.3 \times 10^{-3} \text{ mol AlCl}_3\text{(aq)}$$

$$0.51 \text{ g CuCl}_2 \times \frac{\text{mol}}{134.45 \text{ g}} \text{ CuCl}_2 \times \frac{2 \text{ mol AlCl}_3}{3 \text{ mol CuCl}_2} = 2.5 \times 10^{-3} \text{ mol AlCl}_3\text{(aq)}$$

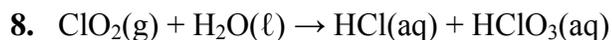
Copper(II) chloride is limiting.



$$33.76 \text{ g Zn} \times \frac{\text{mol}}{65.41 \text{ g}} \text{ Zn} \times \frac{1 \text{ mol ZnCl}_2}{1 \text{ mol Zn}} = 0.5161 \text{ mol ZnCl}_2\text{(aq)}$$

$$54.08 \text{ g HCl} \times \frac{\text{mol}}{36.46 \text{ g}} \text{ HCl} \times \frac{1 \text{ mol ZnCl}_2}{2 \text{ mol HCl}} = 0.7416 \text{ mol ZnCl}_2\text{(aq)}$$

Hydrogen chloride is in excess. (Zinc is limiting.)



$$71.00 \text{ g ClO}_2 \times \frac{\text{mol}}{67.45 \text{ g}} \text{ ClO}_2 \times \frac{1 \text{ mol HCl}}{1 \text{ mol ClO}_2} = 1.053 \text{ mol HCl(aq)}$$

$$19.00 \text{ g H}_2\text{O} \times \frac{\text{mol}}{18.02 \text{ g}} \text{ H}_2\text{O} \times \frac{1 \text{ mol HCl}}{1 \text{ mol H}_2\text{O}} = 1.054 \text{ mol HCl(aq)}$$

Chloride dioxide is limiting.