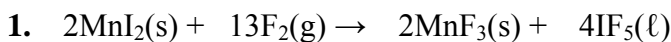


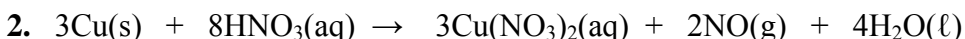
# Expected Quantity of Product Problems Answer Key



$$1.24 \text{ g MnI}_2 \times \frac{\text{mol}}{308.74 \text{ g}} \text{MnI}_2 \times \frac{2 \text{ mol MnF}_3}{2 \text{ mol MnI}_2} \times 111.94 \frac{\text{g}}{\text{mol}} \text{MnF}_3 = 0.450 \text{ g MnF}_3(\text{s})$$

$$25.0 \text{ g F}_2 \times \frac{\text{mol}}{38.00 \text{ g}} \text{F}_2 \times \frac{2 \text{ mol MnF}_3}{13 \text{ mol F}_2} \times 111.94 \frac{\text{g}}{\text{mol}} \text{MnF}_3 = 11.3 \text{ g MnF}_3(\text{s})$$

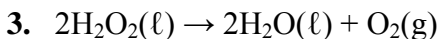
$\text{MnI}_2(\text{s})$  is the limiting reactant, and the expected mass of manganese(III) fluoride is 0.450g.



$$57.4 \text{ g Cu} \times \frac{\text{mol}}{63.55 \text{ g}} \text{Cu} \times \frac{2 \text{ mol NO}}{3 \text{ mol Cu}} \times 30.01 \frac{\text{g}}{\text{mol}} \text{NO} = 18.1 \text{ g NO}(\text{g})$$

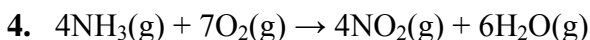
$$165 \text{ g HNO}_3 \times \frac{\text{mol}}{63.02 \text{ g}} \text{HNO}_3 \times \frac{2 \text{ mol NO}}{8 \text{ mol HNO}_3} \times 30.01 \frac{\text{g}}{\text{mol}} \text{NO} = 19.6 \text{ g NO}(\text{g})$$

Copper is the limiting reactant, and the expected mass of  $\text{NO}(\text{g})$  is 18.1g.



$$10.0 \text{ g H}_2\text{O}_2 \times \frac{\text{mol}}{34.02 \text{ g}} \text{H}_2\text{O}_2 \times \frac{2 \text{ mol H}_2\text{O}}{2 \text{ mol H}_2\text{O}_2} \times 18.02 \frac{\text{g}}{\text{mol}} \text{H}_2\text{O} = 5.30 \text{ g H}_2\text{O}(\text{l})$$

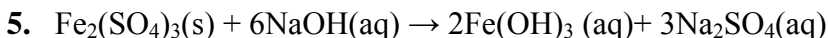
The expected mass of water is 5.30 g.



$$1.30 \times 10^3 \text{ g NH}_3 \times \frac{\text{mol}}{17.04 \text{ g}} \times \frac{4 \text{ mol NO}_2}{4 \text{ mol NH}_3} \times 46.01 \frac{\text{g}}{\text{mol}} \text{NO}_2 = 3.51 \times 10^3 \text{ g} = 3.51 \text{ kg NO}_2(\text{g})$$

$$4.21 \times 10^3 \text{ g O}_2 \times \frac{\text{mol}}{32.00 \text{ g}} \text{O}_2 \times \frac{4 \text{ mol NO}_2}{7 \text{ mol O}_2} \times 46.01 \frac{\text{g}}{\text{mol}} \text{NO}_2 = 3.46 \times 10^3 \text{ g} = 3.46 \text{ kg NO}_2(\text{g})$$

The expected mass of nitrogen dioxide is 3.46 kg. Oxygen gas is limiting.



$$10.0 \text{ g Fe}_2(\text{SO}_4)_3 \times \frac{\text{mol}}{399.91 \text{ g}} \text{Fe}_2(\text{SO}_4)_3 \times \frac{2 \text{ mol Fe}(\text{OH})_3}{1 \text{ mol Fe}_2(\text{SO}_4)_3} \times 106.88 \frac{\text{g}}{\text{mol}} \text{Fe}(\text{OH})_3 = 5.35 \text{ g Fe}(\text{OH})_3(\text{aq})$$

$$10.0 \text{ g NaOH} \times \frac{\text{mol}}{40.0 \text{ g}} \text{NaOH} \times \frac{2 \text{ mol Fe}(\text{OH})_3}{6 \text{ mol NaOH}} \times 106.88 \frac{\text{g}}{\text{mol}} \text{Fe}(\text{OH})_3 = 8.91 \text{ g Fe}(\text{OH})_3(\text{aq})$$

The expected mass of iron(III) hydroxide is 5.35g. Iron(III) sulfate is limiting.