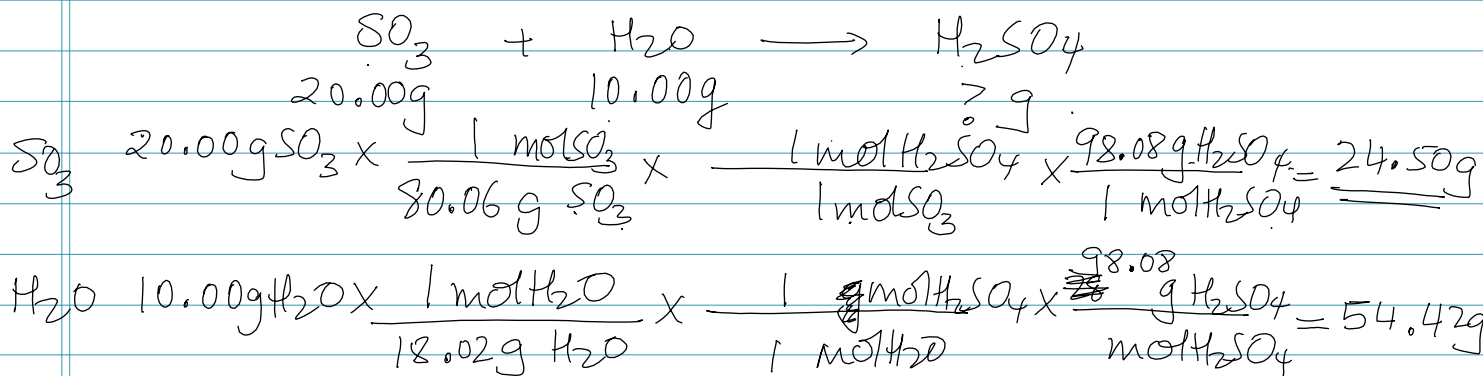


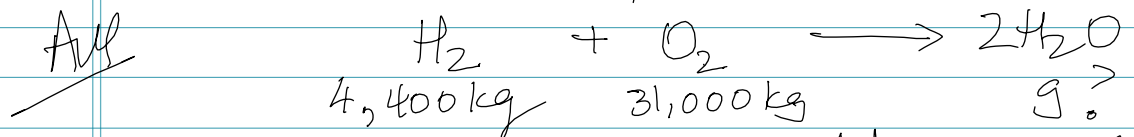
## Limiting Reagent

- ① Sulfur trioxide reacts with water to form sulfuric acid. If 20.00g sulfur trioxide reacts with 10.00g water, how much sulfuric acid is formed?



SO<sub>3</sub> is the limiting reagent and 24.50g H<sub>2</sub>SO<sub>4</sub> are made

- ② During the launch of a shuttle 4,400kg H<sub>2</sub> reacts with 31,000kg O<sub>2</sub>. What is the limiting reagent and how much H<sub>2</sub>O is produced?



$$\text{H}_2 \quad 4,400\text{kg H}_2 \times \frac{1000 \text{ g H}_2}{1 \text{ kg H}_2} \times \frac{1 \text{ mol H}_2}{2.016 \text{ g H}_2} \times \frac{2 \text{ mol H}_2\text{O}}{1 \text{ mol H}_2} = 2.18 \times 10^6 \text{ mol H}_2\text{O}$$

$$\text{O}_2 \quad 31,000\text{kg O}_2 \times \frac{1000 \text{ g O}_2}{1 \text{ kg O}_2} \times \frac{1 \text{ mol O}_2}{32.00 \text{ g O}_2} \times \frac{2 \text{ mol H}_2\text{O}}{1 \text{ mol O}_2} = 1.93 \times 10^6 \text{ mol H}_2\text{O}$$

$$1.93 \times 10^6 \text{ mol} < 2.18 \times 10^6 \text{ mol H}_2\text{O}$$

limiting reagent is oxygen

$$1.93 \times 10^6 \text{ mol H}_2\text{O} \times \frac{18.01 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} = \boxed{3.49 \times 10^7 \text{ g H}_2\text{O}}$$