

Percent Yield Calculations Practice Problems

1) A reaction with a calculated yield of 9.23 g produced 7.89 g of product. What is the percent yield for this reaction?

2) 5.96 g of ammonia (17.031 g/mol) react completely according to the following reaction:



What is the theoretical yield of urea (CN_2OH_4 60.056) for this reaction?

3) 9.87 g of ammonia (17.031 g/mol) react completely according to the following reaction:



If 13.74 g of urea (CN_2OH_4 60.056 g/mol) are produced, what is the percent yield for this reaction?

4) 85.4 g of chlorine (70.91 g/mol) reacts completely according to the following reaction:



If 104 g of phosphorus trichloride (137.3 g/mol) is produced, what is the percent yield for this reaction?

5) 15.4 g of methanol (CH_3OH 32.042 g/mol) reacts completely according to the following reaction:



If 12.35 g of formaldehyde (30.026 g/mol) is produced, what is the percent yield for this reaction?

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1) A reaction with a calculated yield of 9.23 g produced 7.89 g of product. What is the percent yield for this reaction?

$$\% \text{ YIELD} = \frac{\text{ACTUAL YIELD}}{\text{THEORETICAL YIELD}} \times 100 \Rightarrow \frac{7.89 \text{ g}}{9.23 \text{ g}} \times 100 = 85.5\%$$

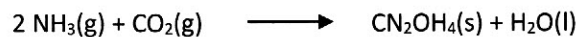
2) 5.96 g of ammonia (17.031 g/mol) react completely according to the following reaction:



What is the theoretical yield of urea (CN_2OH_4 60.056) for this reaction?

$$5.96 \text{ g} \times \frac{\text{mol NH}_3}{17.031 \text{ g}} \times \frac{1 \text{ mol CN}_2\text{OH}_4}{2 \text{ mol NH}_3} \times \frac{60.056 \text{ g}}{\text{mol CN}_2\text{OH}_4} = 10.5 \text{ g}$$

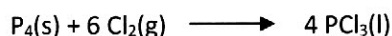
3) 9.87 g of ammonia (17.031 g/mol) react completely according to the following reaction:



If 13.74 g of urea (CN_2OH_4 60.056 g/mol) are produced, what is the percent yield for this reaction?

$$\begin{array}{l} \text{ACTUAL YIELD} \uparrow \\ 9.87 \text{ g} \times \frac{\text{mol NH}_3}{17.031 \text{ g}} \times \frac{\text{mol CN}_2\text{OH}_4}{2 \text{ mol NH}_3} \times \frac{60.056 \text{ g}}{\text{mol CN}_2\text{OH}_4} = 17.4 \text{ g} \\ \text{THEORETICAL YIELD} \downarrow \end{array} \quad \% \text{ YIELD} = \frac{13.74 \text{ g}}{17.4 \text{ g}} \times 100 = 79.0\%$$

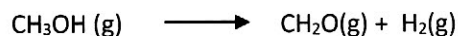
4) 85.4 g of chlorine (70.91 g/mol) reacts completely according to the following reaction:



If 104 g of phosphorus trichloride (137.3 g/mol) is produced, what is the percent yield for this reaction?

$$\begin{array}{l} \text{ACTUAL YIELD} \uparrow \\ 85.4 \text{ g} \times \frac{\text{mol Cl}_2}{70.91 \text{ g}} \times \frac{4 \text{ mol PCl}_3}{6 \text{ mol Cl}_2} \times \frac{137.3 \text{ g}}{\text{mol PCl}_3} = 110. \text{ g} \\ \text{THEORETICAL YIELD} \downarrow \end{array} \quad \% \text{ YIELD} = \frac{104}{110.} \times 100 = 94.5\%$$

5) 15.4 g of methanol (CH_3OH 32.042 g/mol) reacts completely according to the following reaction:



If 12.35 g of formaldehyde (30.026 g/mol) is produced, what is the percent yield for this reaction?

$$\begin{array}{l} \text{ACTUAL YIELD} \uparrow \\ 15.4 \text{ g} \times \frac{\text{mol CH}_3\text{OH}}{32.042 \text{ g}} \times \frac{\text{mol CH}_2\text{O}}{\text{mol CH}_3\text{OH}} \times \frac{30.026 \text{ g}}{\text{mol CH}_2\text{O}} = 14.4 \text{ g} \\ \text{THEORETICAL YIELD} \downarrow \end{array} \quad \% \text{ YIELD} = \frac{12.35 \text{ g}}{14.4 \text{ g}} \times 100 = 85.8\%$$