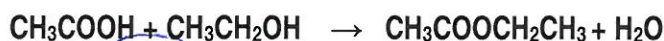# Percent Yield Practice Problems

1. Ethyl acetate is a solvent produced by heating ethanol and acetic acid together in the prescence of sulfuric acid which is added to speed up the reaction. The ethyl acetate is distilled off as it forms. The equation for this process is as follows:

$$CH_3COOH + CH_3CH_2OH \rightarrow CH_3COOCH_2CH_3 + H_2O$$

actual yield

Determine the percentage yield if 68.3 g of ethyl acetate should be produced but only 43.9 g is recovered

theoretical yield

$$\% \text{ yield} = \frac{actual}{theoretical} \times 100 = \frac{43.9g}{68.3g} \times 100 = \boxed{64.3 \%}$$

2. Tungsten can be produced from its oxide by reacting the oxide with hydrogen at a high temperature according to thefollowing equation:

$$WO_3 + 3H_2 \rightarrow W + 3H_2O$$
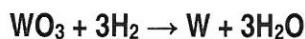
actual yield

What is the percentage yield if 56.9 g of WO_3 yields 41.4 g of tungsten in the lab?

Theoretical yield:

$$56.9g\, WO_3 \times \frac{1\, mol\, WO_3}{231.84g\, WO_3} \times \frac{1\, mol\, W}{1\, mol\, WO_3} \times \frac{183.84g\, W}{1\, mol\, W} = 45.1g\, W$$

$$\% \text{ yield} = \frac{41.4g}{45.1g} \times 100 = \boxed{91.8\%}$$

actual yield

3. If 6.57 g of iron react with an excess of hydrochloric acid, HCl, then 11.2 g of iron(II) chloride are obtained in addition to hydrogen gas. Find the theoretical and percent yields.

$$Fe + 2 HCl \rightarrow FeCl_2 + H_2$$
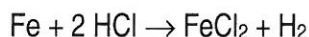
Theoretical yield:

$$6.57g\, Fe \times \frac{1\, mol\, Fe}{55.85g\, Fe} \times \frac{1\, mol\, FeCl_2}{1\, mol\, Fe} \times \frac{126.75g\, FeCl_2}{1\, mol\, FeCl_2} = 14.9g\, FeCl_2$$

$$\% \text{ yield} = \frac{11.2g}{14.9g} \times 100 = \boxed{75.2\%}$$