General Chemistry
Mr. MacGillivray
Quiz #24:
Stoichiometry II

Solve the following problems using dimensional analysis. Include units in your answers. Be sure to round the answers to the correct number of significant figures.

The following questions refer to the following reaction:

$$Fe_2O_3\,(s) + 3CO \Rightarrow 2Fe\,(s) + 3\,CO_2\,(g)$$

1) How many g of carbon dioxide can be produced from 5.00 g of iron (III) oxide?

2) How many g of iron can be produced from 5.00 mol of iron (III) oxide ?

3) How many liters of carbon monoxide gas (at STP) would be needed to produce 2.86×10^{24} atoms of iron?

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DIOXIDE

1) How many g of carbon dioxide can be produced from 5.00 g of iron (III) oxide?

$$5.00\,g\,Fe_2O_3 \times \frac{1\,mol\,Fe_2O_3}{159.7\,g\,Fe_2O_3} \times \frac{3\,mol\,CO_2}{1\,mol\,Fe_2O_3} \times \frac{44.0\,g\,CO_2}{1\,mol\,CO_2} = 4.13\,g\,CO_2$$

2) How many g of iron can be produced from 5.00 mol of iron (III) oxide ?

$$5.00\,mol\,Fe_2O_3 \times \frac{2\,mol\,Fe}{1\,mol\,Fe_2O_3} \times \frac{55.85\,g\,Fe}{1\,mol\,Fe} = 559\,g\,Fe$$

3) How many liters of carbon monoxide gas (at STP) would be needed to produce 2.86×10^{24} atoms of iron?

$$2.86 \times 10^{24}\,atoms\,Fe \times \frac{1\,mol\,Fe}{6.02 \times 10^{23}\,atoms\,Fe} \times \frac{3\,mol\,CO}{2\,mol\,Fe} \times \frac{22.4\,L\,CO}{1\,mol\,CO} =$$

171 L CO