Quiz
Chemistry 121/100 **Name** Key

32.07 64.14
32.00 12.01
12.01 g/mol 64.07 g/mol 76.15 g/mol 44.01 g/mol

1. For the reaction: $3C + 2SO_2 \rightarrow CS_2 + CO_2$, how many grams of carbon dioxide are formed from the reaction of 4.0 grams of carbon with excess sulfur dioxide?

$$4.0\,g\,C \times \frac{1\,mol}{12.01\,g} \times \frac{1\,CO_2}{3\,C} \times \frac{44.01\,g}{mol} = 4.9\,g\,CO_2 \quad (2\ s.f.)$$

2. For the reaction: $2Al + 3Br_2 \rightarrow 2AlBr_3$, if 8.0 grams of aluminum are combined with 5.0 grams of bromine:
26.98 g/mol 159.8 g/mol ↖ 266.68 g/mol

a. How many grams of aluminum bromide are produced?

$$8.0\,g\,Al \times \frac{1\,mol}{26.98\,g} \times \frac{2\,AlBr_3}{2\,Al} \times 266.68\,g/mol =$$

b. Which reactant is the limiting reactant?

$$5.0\,g\,Br_2 \times \frac{1\,mol}{159.8\,g} \times \frac{2\,AlBr_3}{3\,Br_2} \times 266.68\,g/mol = 5.6\,g\,AlBr_3 \quad (2\ s.f.)$$

Bromine is the limiting reactant.

3. For the reaction: $CO(g) + 2H_2(g) \rightarrow CH_3OH\ (l)$
28.01 2.02 32.05

12.0 grams of methanol (CH_3OH) are produced from 14.0 grams of carbon monoxide reacting with excess hydrogen gas. What is the percent yield for this reaction?

$$14.0\,g\,CO \times \frac{1\,mol}{28.01\,g} \times \frac{1\,CH_3OH}{1\,CO} \times \frac{32.05\,g}{mol} = 16.02\,g\,CH_3OH$$

$$\frac{12.0\,g}{16.02\,g} \times 100\% = 75.0\% \quad (3\ s.f.)$$

4. For the reaction: $3CaCl_2 + 2H_3PO_4 \rightarrow Ca_3(PO_4)_2 + 6HCl$
110.98 98.0 310.18

How many grams of calcium phosphate would theoretically be produced from 20.0 g of calcium chloride and 20.0 g of phosphoric acid? (3 s.f.)

$$20.0\,g\,CaCl_2 \times \frac{1\,mol}{110.98} \times \frac{1\,Ca_3(PO_4)_2}{3\,CaCl_2} \times \frac{310.18\,g}{mol} = 18.6\,g\,Ca_3(PO_4)_2$$

limiting

$$20.0\,g\,H_3PO_4 \times \frac{1\,mol}{98.0\,g} \times \frac{1\,Ca_3(PO_4)_2}{2\,H_3PO_4} \times \frac{310.18\,g}{mol} =$$