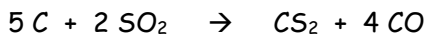


Limiting Reagent

Name - _____

1a.) What mass of CS_2 is produced when 17.5 g of C are reacted with 39.5 g of SO_2 according to the equation?



Answer - $17.5 \text{ g C} \times \frac{1 \text{ mol C}}{12.01 \text{ g C}} \times \frac{1 \text{ mol } CS_2}{5 \text{ mol C}} \times \frac{76.13 \text{ g } CS_2}{1 \text{ mol } CS_2} = 22.18609 \text{ g } CS_2$

Limiting reagent

$39.5 \text{ g } SO_2 \times \frac{1 \text{ mol } SO_2}{64.06 \text{ g } SO_2} \times \frac{1 \text{ mol } CS_2}{2 \text{ mol } SO_2} \times \frac{76.13 \text{ g } CS_2}{1 \text{ mol } CS_2} = 23.471237 \text{ g } CS_2$

Excess reagent

Product = 22.2 g CS_2

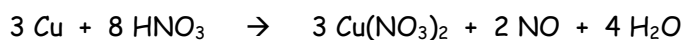
b.) What mass of the excess reactant will be left over?

Answer - $17.5 \text{ g C} \times \frac{1 \text{ mol C}}{12.01 \text{ g C}} \times \frac{2 \text{ mol } SO_2}{5 \text{ mol C}} \times \frac{64.06 \text{ g } SO_2}{1 \text{ mol } SO_2} = 37.33721898 \text{ g } SO_2$

$39.5 - 37.33721898 = \underline{2.2 \text{ g } SO_2 \text{ excess}}$

2a.) What mass of NO is produced when 87.0 g of Cu are reacted with 225 g of HNO_3 ?

The reaction is as follows.



Answer - $225 \text{ g } HNO_3 \times \frac{1 \text{ mol } HNO_3}{63.02 \text{ g } HNO_3} \times \frac{2 \text{ mol } NO}{8 \text{ mol } HNO_3} \times \frac{30.01 \text{ g } NO}{1 \text{ mol } NO} = 26.78613932 \text{ g } NO$

Limiting reagent

$87.0 \text{ g Cu} \times \frac{1 \text{ mol Cu}}{63.55 \text{ g Cu}} \times \frac{2 \text{ mol } NO}{3 \text{ mol Cu}} \times \frac{30.01 \text{ g } NO}{1 \text{ mol } NO} = 27.389142 \text{ g } NO$

Excess reagent

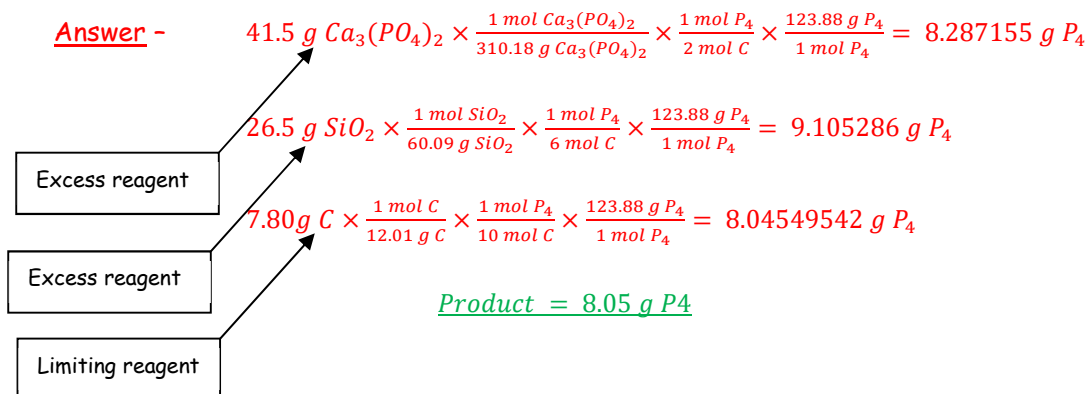
Product = 26.8 g NO

b.) What mass of the excess reactant will be left over?

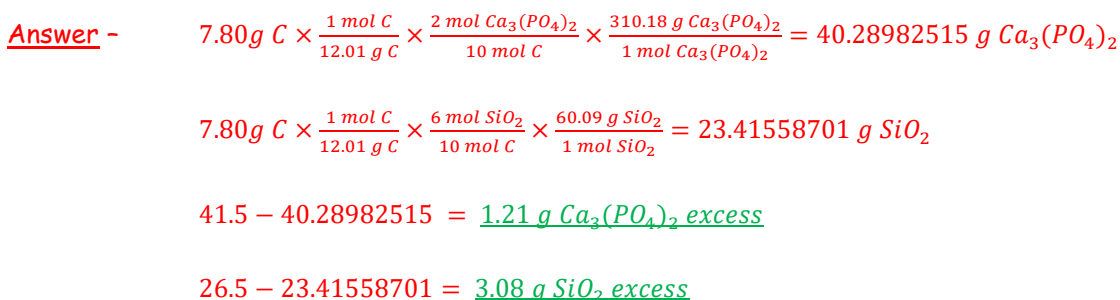
Answer - $225 \text{ g } HNO_3 \times \frac{1 \text{ mol } HNO_3}{63.02 \text{ g } HNO_3} \times \frac{3 \text{ mol Cu}}{8 \text{ mol } HNO_3} \times \frac{63.55 \text{ g Cu}}{1 \text{ mol Cu}} = 85.08459616 \text{ g Cu}$

$87.0 - 85.08459616 = \underline{1.9 \text{ g Cu excess}}$

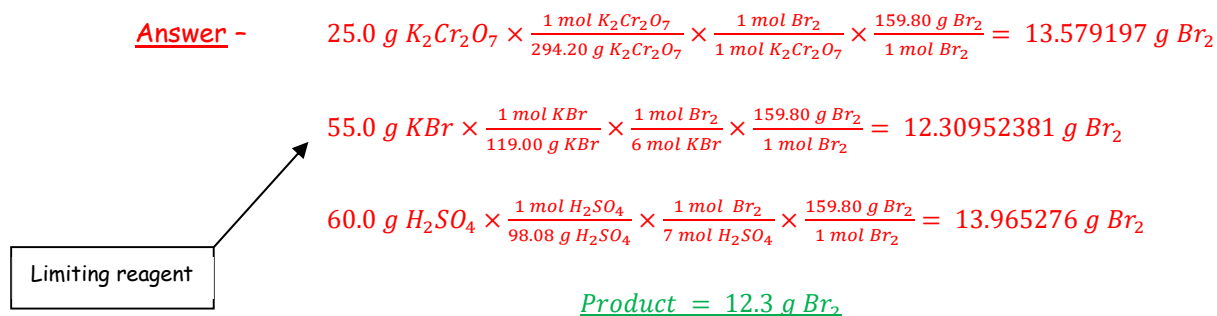
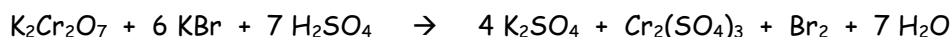
3a.) What mass of P_4 is produced when 41.5 g of $Ca_3(PO_4)_2$, 26.5 g of SiO_2 and 7.80 g of C are reacted according to the following equation. $2 Ca_3(PO_4)_2 + 6 SiO_2 + 10 C \rightarrow P_4 + 6 CaSiO_3 + 10 CO$



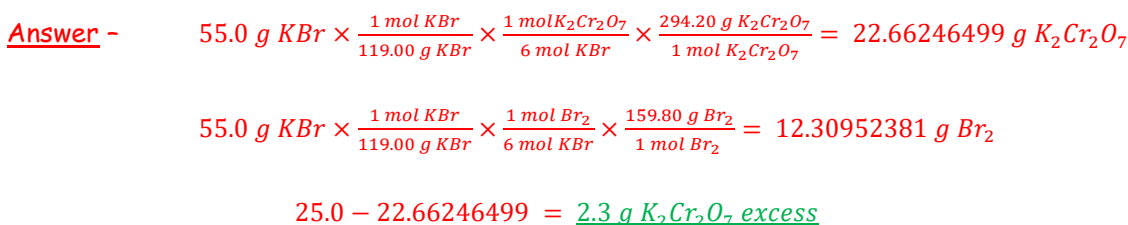
b.) How many grams of each excess reactant will remain unreacted?



4a.) What mass of Br_2 is produced when 25.0 g of $K_2Cr_2O_7$, 55.0 g of KBr and 60.0 g of H_2SO_4 are reacted.

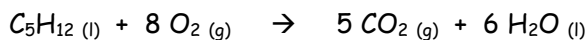


b.) How many grams of each excess reactant will remain unreacted?



$$60.0 - 52.88627451 = \underline{7.1 \text{ g } H_2SO_4 \text{ excess}}$$

5.) What volume of CO_2 (g) at STP can be made when 0.0250 L of C_5H_{12} (l) (density = $626.0 \frac{g}{L}$), is reacted with 40.0 L of O_2 (g) at STP in the following equation.



Answer - $0.0250 \text{ L } C_5H_{12} \times \frac{626.0 \text{ g } C_5H_{12}}{1 \text{ L } C_5H_{12}} \times \frac{1 \text{ mol } C_5H_{12}}{72.17 \text{ g } C_5H_{12}} \times \frac{5 \text{ mol } CO_2}{1 \text{ mol } C_5H_{12}} \times \frac{22.41 \text{ L } CO_2}{1 \text{ mol } CO_2} = 24.297942 \text{ L } CO_2$

$$40.0 \text{ L } O_2 \times \frac{1 \text{ mol } O_2}{22.41 \text{ L } O_2} \times \frac{5 \text{ mol } CO_2}{8 \text{ mol } O_2} \times \frac{22.41 \text{ L } CO_2}{1 \text{ mol } CO_2} = 25.0 \text{ L } CO_2$$

$$\underline{\text{Product} = 24.3 \text{ L } CO_2}$$

6.) If 50.0 mL of 0.100 M HCl is allowed to react with 30.0 mL of 0.200 M NaOH, which is the reactant in excess?



Moles of NaCl (Based on HCl) $0.050 \text{ L } HCl \times \frac{0.100 \text{ mol } HCl}{1 \text{ L } HCl} \times \frac{1 \text{ mol } NaCl}{1 \text{ mol } HCl} = 5.00 \times 10^{-3} \text{ mol } NaCl$

Moles of NaCl (Based on NaOH) $0.030 \text{ L } NaOH \times \frac{0.200 \text{ mol } NaOH}{1 \text{ L } NaOH} \times \frac{1 \text{ mol } NaCl}{1 \text{ mol } NaOH} = 6.00 \times 10^{-3} \text{ mol } NaCl$

Since NaOH makes more NaCl, the NaOH is in EXCESS

7.) If 0.250 g of $Ba(OH)_2$ is mixed with 15.0 mL of 0.125 M HBr, what mass of $BaBr_2$ can be formed?



$$0.250 \text{ g } Ba(OH)_2 \times \frac{1 \text{ mol } Ba(OH)_2}{171.32 \text{ g } Ba(OH)_2} \times \frac{1 \text{ mol } BaBr_2}{1 \text{ mol } Ba(OH)_2} \times \frac{297.1 \text{ g } BaBr_2}{1 \text{ mol } BaBr_2} = 0.4335454 \text{ g } BaBr_2$$

$$0.0150 \text{ L } HBr \times \frac{0.125 \text{ mol } HBr}{1 \text{ L } HBr} \times \frac{1 \text{ mol } BaBr_2}{2 \text{ mol } HBr} \times \frac{297.1 \text{ g } BaBr_2}{1 \text{ mol } BaBr_2} = 0.27853125 \text{ g } BaBr_2$$

$$\underline{\text{Product} = 0.279 \text{ g } BaBr_2}$$