KEY

Mole Calculations Continued . . .

Name - _____

6.) Calculate the number of moles contained in the following.

a.) 10.6 L of SO_2 (g) at STP

$10.6\ L\ SO_2 \times \frac{1\ mol\ SO_2}{22.4\ L\ SO_2} = 0.473\ mol\ SO_2$

b.) 7.50×10^{21} $molecules$ of HNO_3

$7.50 \times 10^{21} molec\ HNO_3 \times \frac{1\ mol\ HNO_3}{6.022 \times 10^{23}\ molec\ HNO_3} = 0.0125\ mol\ HNO_3$

c.) 425 mg of $Ca(OH)_2$

$0.425\ g\ Ca(OH)_2 \times \frac{1\ mol\ Ca(OH)_2}{74.1 g\ Ca(OH)_2} = 0.00574\ mol\ Ca(OH)_2$

d.) 4.25×10^{12} $molecules$ of Fe_2O_3

$4.25 \times 10^{12} molec\ Fe_2O_3 \times \frac{1\ mol\ Fe_2O_3}{6.022 \times 10^{23}\ molec\ Fe_2O_3} = 7.06 \times 10^{-12}\ mol\ Fe_2O_3$

e.) 0.950 kg of NaOH

$950\ g\ NaOH \times \frac{1\ mol\ NaOH}{40.00\ g\ NaOH} = 23.8\ mol\ NaOH$

f.) 25.0 mL of N_2 (g) at STP

$0.025.0\ L\ N_2 \times \frac{1\ mol\ N_2}{22.4\ L\ N_2} = 0.00112\ mol\ N_2$

g.) 5.50×10^{25} $molecules$ of CCl_4

$5.50 \times 10^{25} molec\ CCl_4 \times \frac{1\ mol\ CCl_4}{6.022 \times 10^{23}\ molec\ CCl_4} = 91.3\ mol\ CCl_4$

h.) 0.120 L of NO_2 (g) at STP

$0.120\ L\ NO_2 \times \frac{1\ mol\ NO_2}{22.4\ L\ NO_2} = 0.00536\ mol\ NO_2$

7.) Calculate the volume of the following gases at STP.

a.) 0.235 mol of B_2H_6 (g)

$0.235\ mol\ B_2H_6 \times \frac{22.4\ L\ B_2H_6}{1\ mol\ B_2H_6} = 5.26\ L\ B_2H_6$

b.) 9.36 mol of SiH_4 (g)

$2.10 \times 10^2 L\ SiH_4$

c.) $2.5 \times 10^3 mol$ of C_2H_6 (g)

$56000\ L\ C_2H_6$

8.) Calculate the mass of each of the following.

a.) 0.125 mol of CO_2 (g) at STP

$0.125\ mol\ CO_2 \times \frac{44.01\ g\ CO_2}{1\ mol\ CO_2} = 5.50\ g\ CO_2$

b.) 5.48 mol of $FeCl_3$ (s)

$5.48\ mol\ FeCl_3 \times \frac{162.2\ g\ FeCl_3}{1\ mol\ FeCl_3} = 889\ g\ FeCl_3$

c.) 6.54×10^{-4} mol of HCN (g) at STP

$6.54 \times 10^{-4}\ mol\ HCN \times \frac{27.01\ g\ HCN}{1\ mol\ HCN} = 0.0177\ g\ HCN$

d.) 15.4 mol of $Ni(OH)_2$ (g)

$15.4\ mol\ Ni(OH)_2 \times \frac{92.69\ g\ Ni(OH)_2}{1\ mol\ Ni(OH)_2} = 1430\ g\ Ni(OH)_2$

KEY

9.) Calculate the mass of $1\ mole$ of each of the following.

a.) $Na_2B_4O_7 \cdot 10H_2O$ $\frac{381.2\ g}{1\ mol}$

b.) My grandmother has a mass of $52\ kg$. $\frac{52\ kg}{1\ grandmother} \times \frac{1000\ g}{1\ kg} \times \frac{6.022\times10^{23}\ grandmother}{1\ mol} = 3.1 \times 10^{28}\ \frac{g}{mol}\ or\ \ 3.1 \times 10^{25}\ \frac{kg}{mol}$

c.) A bismuth atom having a mass of $3.52 \times 10^{-22}\ g$. $\frac{3.52\times10^{-22} g}{1\ atom} \times \frac{6.022\times10^{23}\ atoms}{1\ mol} = 212\ g$

d.) An electron having a mass of $9.1 \times 10^{-31}\ g$. $\frac{9.1\times10^{-31} g}{1\ electron} \times \frac{6.022\times10^{23}\ electron}{1\ mol} = 5.5 \times 10^{-7}\ g$

e.) $Cu_3(OH)_2(CO_3)_2$ $\frac{344.5\ g}{1\ mol}$

f.) A book having a mass of $1.34\ kg$. $\frac{1340\ g}{1\ book} \times \frac{6.022\times10^{23}\ book}{1\ mol} = 8.07 \times 10^{23}\ g$

10.) An unknown gas sample contains only one of the compounds SO_3, CH_4, NF_3, or C_2H_2. If $1\ molecule$ of the gas has a mass of $1.18 \times 10^{-22}\ g$, which type of molecule is contained in the sample?

$\frac{1.18\times10^{-22}\ g}{1\ molec} \times \frac{6.022\times10^{23}\ molec}{1\ mol} = 71.06\ \frac{g}{mol}$

SO_3 = $80.06\ \frac{g}{mol}$ CH_4 = $16.04\ \frac{g}{mol}$ NF_3 = $71.00\ \frac{g}{mol}$ C_2H_2 = $26.02\ \frac{g}{mol}$

11a.) General Saunders "Kelowna Fried Chicken" features the Super Barrel, containing $2\ moles$ of chickens (deep fried). How many drumsticks are contained in the Super Barrel?

$2\ mol\ chickens \times \frac{6.022\times10^{23} chickens}{1\ mol\ chickens} \times \frac{2\ drumsticks}{1\ chicken} = 2.409 \times 10^{24}\ drumsticks$

b.) How many drumsticks, wings and thighs are in the super Barrel all together?

$2\ mol\ chickens \times \frac{6.022\times10^{23} chickens}{1\ mol\ chickens} \times \frac{6\ drum,wings\ and\ thighs}{1\ chicken} = 7.226 \times 10^{24} all\ together$