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1. a) $\frac{3\text{ mol } NH_3}{1\text{ mol } NH_3} \Big/ \frac{1\text{ mol } N}{1\text{ mol } NH_3} = 3.0\text{ mol } N$

$\frac{3\text{ mol } NH_3}{1\text{ mol } NH_3} \Big/ \frac{3\text{ mol } H}{1\text{ mol } NH_3} = 9.0\text{ mol } H$

b. $\frac{.25\text{ mol } H_2O}{1\text{ mol } H_2O} \Big/ \frac{2\text{ mol } H}{1\text{ mol } H_2O} = .50\text{ mol } H$

$\frac{.25\text{ mol } H_2O}{1\text{ mol } H_2O} \Big/ \frac{1\text{ mol } O}{1\text{ mol } H_2O} = .25\text{ mol } O$

c. $\frac{5.0\text{ mol } H_2SO_4}{1\text{ mol } H_2SO_4} \Big/ \frac{2\text{ mol } H}{1\text{ mol } H_2SO_4} = 10.\text{ mol } H$

$\frac{5.0\text{ mol } H_2SO_4}{1\text{ mol } H_2SO_4} \Big/ \frac{1\text{ mol } S}{1\text{ mol } H_2SO_4} = 5.0\text{ mol } S$

$\frac{5.0\text{ mol } H_2SO_4}{1\text{ mol } H_2SO_4} \Big/ \frac{4\text{ mol } O}{1\text{ mol } H_2SO_4} = 20.\text{ mol } O$

*NOTE:
Using different periodic tables will change your answers slightly!! (I used the book table for these problems)

2. a) NH_3 *N 14.01 × 1 = 14.01

*H 1.008 × 3 = 3.024

17.034

NH_3 17.03 g/mol

b) H_2O *H 1.008 × 2 = 2.016

O 16.00 × 1 = 16.00

18.016

H_2O 18.02 g/mol

c) H_2SO_4 *H 1.008 × 2 = 2.016

S 32.07 × 1 = 32.07

O 16.00 × 4 = 64.00

98.086

H_2SO_4 98.09 g/mol

d) Continued

d) $Ca(NO_3)_2$ Ca $40.08 \times 1 = 40.08$
N $14.01 \times 2 = 28.02$
O $16.00 \times 6 = 96.00$
164.10

$\boxed{Ca(NO_3)_2 \quad 164.10\ g/mol}$

3. Just multiply the moles by the molar mass

a) $\frac{3\ mol\ NH_3}{1\ mol\ NH_3} \times \frac{17.03\ g}{mol} = 50\ g\ NH_3$ (1 sig fig; 4 sig fig; 1 sig fig)

b) $\frac{.25\ mol\ H_2O}{1\ mol} \times \frac{18.02\ g}{mol} = 4.5\ g\ H_2O$

c) $\frac{5.0\ mol\ H_2SO_4}{1\ mol} \times \frac{98.09\ g}{mol} = 490\ g\ H_2SO_4$

d) $\frac{.75\ mol\ Ca(NO_3)_2}{1\ mol} \times \frac{164.10\ g}{mol} = 120\ g\ Ca(NO_3)_2$

4. a) $\frac{3 \text{ mol } NH_3}{1 \text{ mol}} \times \frac{6.022 \times 10^{23} \text{ molecules}}{} = 2 \times 10^{24}$ molecules NH_3

(1 sig fig; 4 sig fig; 1 sig fig)

b) $\frac{.25 \text{ mol } H_2O}{1 \text{ mol}} \times 6.022 \times 10^{23} \text{ molecules} = 1.5 \times 10^{23}$ molecules H_2O

5. a) $\frac{100. \text{ g } H_2SO_4}{98.09 \text{ g}} \times \frac{1 \text{ mol}}{} = 1.02 \text{ mol } H_2SO_4$

(3 sig fig; 4 sig fig; 3 sig fig)

b) $\frac{.50 \text{ g } Ca(NO_3)_2}{164.10 \text{ g}} \times \frac{\text{mol}}{} = 3.0 \times 10^{-3}$ mol $Ca(NO_3)_2$