

①

Page 170 Probs 1-5

$$1. a) \frac{3 \text{ mol NH}_3}{1 \text{ mol NH}_3} \times \frac{1 \text{ mol N}}{1 \text{ mol NH}_3} = 3.0 \text{ mol N}$$

$$\frac{3 \text{ mol NH}_3}{1 \text{ mol NH}_3} \times \frac{3 \text{ mol H}}{1 \text{ mol NH}_3} = 9.0 \text{ mol H}$$

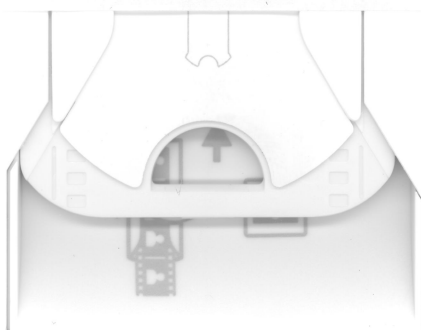
$$b. \frac{.25 \text{ mol H}_2\text{O}}{1 \text{ mol H}_2\text{O}} \times \frac{2 \text{ mol H}}{1 \text{ mol H}_2\text{O}} = .50 \text{ mol H}$$

$$\frac{.25 \text{ mol H}_2\text{O}}{1 \text{ mol H}_2\text{O}} \times \frac{1 \text{ mol O}}{1 \text{ mol H}_2\text{O}} = .25 \text{ mol O}$$

$$c. \frac{5.0 \text{ mol H}_2\text{SO}_4}{1 \text{ mol H}_2\text{SO}_4} \times \frac{2 \text{ mol H}}{1 \text{ mol H}_2\text{SO}_4} = 10.0 \text{ mol H}$$

$$\frac{5.0 \text{ mol H}_2\text{SO}_4}{1 \text{ mol H}_2\text{SO}_4} \times \frac{1 \text{ mol S}}{1 \text{ mol H}_2\text{SO}_4} = 5.0 \text{ mol S}$$

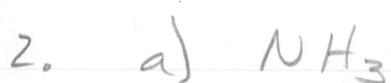
$$\frac{5.0 \text{ mol H}_2\text{SO}_4}{1 \text{ mol H}_2\text{SO}_4} \times \frac{4 \text{ mol O}}{1 \text{ mol H}_2\text{SO}_4} = 20.0 \text{ mol O}$$



(2)

\*NOTE:

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



$$^*\text{N } 14.01 \times 1 = 14.01$$

$$^*\text{H } 1.008 \times 3 = \underline{3.024}$$

$$\boxed{\text{NH}_3 \quad 17.03 \text{ g/mol}} \quad 17.034$$



$$^*\text{H } 1.008 \times 2 = 2.016$$

$$\text{O } 16.00 \times 1 = \underline{16.00}$$

$$\boxed{\text{H}_2\text{O} \quad 18.02 \text{ g/mol}} \quad 18.016$$



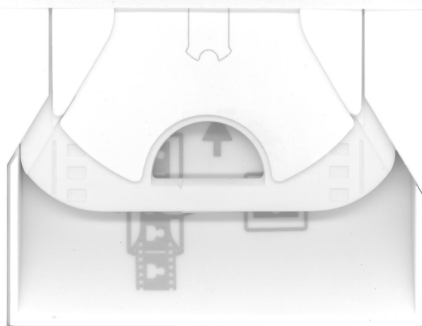
$$^*\text{H } 1.008 \times 2 = 2.016$$

$$\text{S } 32.07 \times 1 = 32.07$$

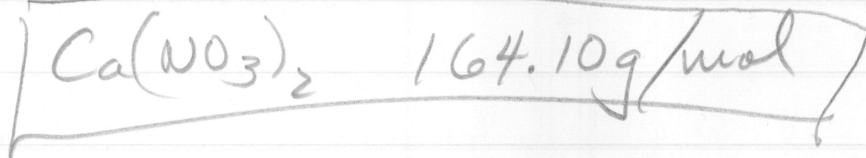
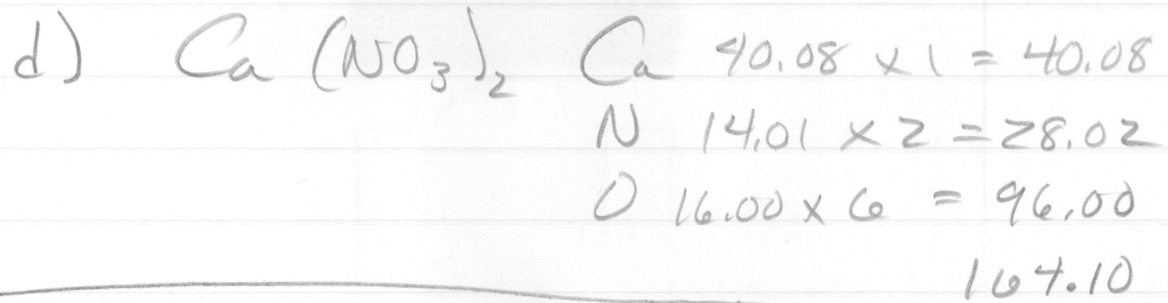
$$\text{O } 16.00 \times 4 = \underline{64.00}$$

$$\boxed{\text{H}_2\text{SO}_4 \quad 98.09 \text{ g/mol}} \quad 98.086$$

d) Continued



(3)



3. Just multiply the moles by the molar mass

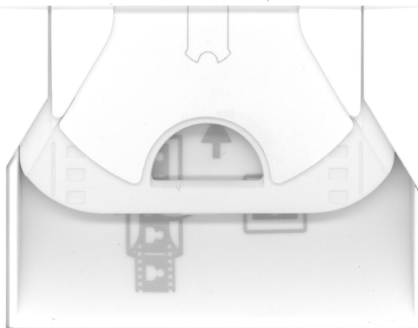
a)  $\frac{3 \text{ mol NH}_3}{1 \text{ mol NH}_3} \times 17.03 \text{ g} = 50 \text{ g NH}_3$

1 sig fig      4 sig fig      1 sig fig

b)  $\frac{0.25 \text{ mol H}_2\text{O}}{1 \text{ mol H}_2\text{O}} \times 18.02 \text{ g} = 4.5 \text{ g H}_2\text{O}$

c)  $\frac{5.0 \text{ mol H}_2\text{SO}_4}{1 \text{ mol H}_2\text{SO}_4} \times 98.09 \text{ g} = 490 \text{ g H}_2\text{SO}_4$

d)  $\frac{0.75 \text{ mol Ca}(\text{NO}_3)_2}{1 \text{ mol Ca}(\text{NO}_3)_2} \times 164.10 \text{ g} = 120 \text{ g Ca}(\text{NO}_3)_2$



(4)

$$4. a) \frac{3 \text{ mol NH}_3}{1 \text{ mol}} \times \frac{6.022 \times 10^{23} \text{ molecules}}{1 \text{ mol}} = 2 \times 10^{24} \text{ molecules NH}_3$$

1 sig fig      4 sig fig      1 sig fig

$$b) \frac{0.25 \text{ mol H}_2\text{O}}{1 \text{ mol}} \times \frac{6.022 \times 10^{23} \text{ molecules}}{1 \text{ mol}} = 1.5 \times 10^{23} \text{ molecules H}_2\text{O}$$

$$5. a) \frac{100. \text{ g H}_2\text{SO}_4}{98.07 \text{ g}} \times \frac{1 \text{ mol}}{1 \text{ mol}} = 1.02 \text{ mol H}_2\text{SO}_4$$

3 sig fig      4 sig fig      3 sig fig

$$b) \frac{0.50 \text{ g Ca(NO}_3)_2}{164.10 \text{ g}} \times \frac{1 \text{ mol}}{1 \text{ mol}} = 3.0 \times 10^{-3} \text{ mol Ca(NO}_3)_2$$

