stoichiometry HW #2

$$N_2 + 3F_2 \rightarrow 2NF_3$$

1. $$\frac{12\ g\ NF_3}{} \left| \frac{1\ mol\ NF_3}{71.01\ g\ NF_3} \right| \frac{3\ mol\ F_2}{2\ mol\ NF_3} = \boxed{0.25\ mol\ F_2}$$

2. $$\frac{10.0\ g\ N_2}{} \left| \frac{1\ mol\ N_2}{28.02\ g\ N_2} \right| \frac{2\ mol\ NF_3}{1\ mol\ N_2} \left| \frac{71.01\ g\ NF_3}{1\ mol\ NF_3} \right. = \boxed{50.7\ g\ NF_3}$$

3. $2CO + O_2 \rightarrow 2CO_2$

$$\frac{4.75 \times 10^{23}\ molec\ CO_2}{} \left| \frac{1\ mol\ CO_2}{6.02 \times 10^{23}\ molec\ CO_2} \right| \frac{1\ mol\ O_2}{2\ mol\ CO_2} \left| \frac{22.4\ L\ O_2}{1\ mol\ O_2} \right. = \boxed{8.84\ L\ O_2}$$

4. $C_3H_8 + 5O_2 \rightarrow 3CO_2 + H_2O$

$$\frac{2.5\ L\ C_3H_8}{} \left| \frac{1\ mol\ C_3H_8}{22.4\ L\ C_3H_8} \right| \frac{3\ mol\ CO_2}{1\ mol\ C_3H_8} \left| \frac{44.01\ g\ CO_2}{1\ mol\ CO_2} \right. = \boxed{15\ g\ CO_2}$$

5. $8Zn + S_8 \rightarrow 8ZnS$

a) $\frac{2.00 \text{ mol } Zn \mid 8 \text{ mol } ZnS}{8 \text{ mol } Zn} = 2.00 \text{ mol } ZnS$

$\frac{1.00 \text{ mol } S_8 \mid 8 \text{ mol } ZnS}{1 \text{ mol } S_8} = 8.00 \text{ mol } ZnS$

compare & pick the smallest value

$\therefore$ 2.00 mol ZnS produced

b) Zn is the limiting reactant b/c Zn can produce the least amount of product

c) $\%\text{ yield} = \frac{\text{actual}}{\text{theoretical}} \times 100$

← Lab (experimental)

↖ "grid" (theoretical, how much should be made)

$\%\text{ yield} = \frac{1.00 \text{ mol}}{2.00 \text{ mol}} \times 100 = 50.0\%\text{ yield}$