

Answer Key

1. $2 \text{Fe}_2\text{O}_3(s) + 3 \text{C}(s) \rightarrow 4 \text{Fe}(s) + 3 \text{CO}_2(g)$
 - a. 21.377 moles C
 - b. 0.493 moles Fe_2O_3
 - c. 2.774 moles CO_2
2. $4 \text{C}_3\text{H}_5(\text{ONO}_2)_3(l) \rightarrow 12 \text{CO}_2(g) + 10 \text{H}_2\text{O}(l) + 6 \text{N}_2(g) + \text{O}_2(g)$
1.19 moles CO_2 , 0.995 moles H_2O , 0.597 moles N_2 and 0.0995 moles O_2 would be formed.
3. $6 \text{Mg}(s) + \text{P}_4(s) \rightarrow 2 \text{Mg}_3\text{P}_2(s)$
62.4 g P_4
4. $4 \text{NH}_3(g) + 7 \text{O}_2(g) \rightarrow 4 \text{NO}_2(g) + 6 \text{H}_2\text{O}(g)$
 1.015×10^{25} molecules H_2O
5. $\text{CH}_4(g) + 4 \text{Cl}_2(g) \rightarrow \text{CCl}_4(l) + 4 \text{HCl}(g)$
31.4 lbs HCl
6. $2 \text{Al}(s) + 3 \text{Br}_2(l) \rightarrow 2 \text{AlBr}_3(s)$
Theoretical yield is 62.0 g, Percent yield is 96.8 %
7. $4 \text{Fe}(s) + 3 \text{O}_2(g) \rightarrow 2 \text{Fe}_2\text{O}_3(s)$
 - a. LR is Fe
 - b. LR is Fe
 - c. LR is O_2
8. $\text{C}_{12}\text{H}_{22}\text{O}_{11}(s) + 8 \text{KClO}_3(s) \rightarrow 12 \text{CO}_2(g) + 11 \text{H}_2\text{O}(l) + 8 \text{KCl}(s)$
LR is KClO_3 , 31.5 moles CO_2 , 28.9 moles H_2O and 21.0 moles KCl will be produced
9. $2 \text{BF}_3(g) + 3 \text{H}_2(g) \rightarrow 2 \text{B}(s) + 6 \text{HF}(g)$
 - a. LR is BF_3
 - b. 35.39 g HF generated
 - c. 3.21 g of H_2 left over
 - d. Experimental yield is 25.69 g HF
10. $5 \text{C}(s) + 2 \text{SO}_2(g) \rightarrow \text{CS}_2(l) + 4 \text{CO}(g)$
LR is C, 74.6 g of CO are produced, and 9.73 g of SO_2 are left over.