**Level 1 Answers**:

1. CH4 + 2O2 🡪 CO2 + 2H2O
2. 2Al + 6HBr 🡪 2AlBr3 + 3H2
3. 6CO2 + 6H2O 🡪 C6H12O6 + 6O2
4. Pb(NO3)2 + 2NaI 🡪 PbI2 + 2NaNO3
5. 8ZnS + 4O2 🡪 8ZnO2 + S8
6. 2BN + 3F2 🡪 2BF3 + N2

**Level 2 Answers**:

1. Fe2O3 + 3H2 🡪 2Fe + 3H2O
   1. 19.5 moles H2O
   2. 30 moles H2
   3. 22.5 moles H2
2. 4Al + 3O2 🡪 2Al2O3
   1. 3.80 moles Al2O3
   2. 3.41 moles O2
   3. 4.10 moles O2

**Level 3 Answers**:

1. 2Al + 3H2SO4 🡪 3H2 + Al2(SO4)3
   1. 599 g Al2(SO4)3
   2. 161 g Al
   3. 124 g Al
2. 3Ca + N2 🡪 Ca3N2
   1. 63.7 g Ca3N2
   2. 60.1 g N2
   3. 274 g N2
3. 2Al + 3Cl2 🡪 2AlCl3
   1. 0.0737 mol Cl2
   2. 172 g Al

**Level 4 Answers:**

1. V2O5 + 5Ca 🡪 5CaO + 2V
   1. 4.19 g CaO
   2. 3.86 g Ca
   3. 13.3 g V2O5
2. 3Fe + 4H2O 🡪 4H2 + Fe3O4
   1. 26.9 g Fe3O4
   2. 0.482 g H2O
   3. 46.8 g Fe
3. Ca(OH)2 + 2NH4Cl 🡪 2NH4OH + CaCl2
   1. 18.5 g CaCl2
   2. 9.21 g NH4OH
   3. 8.16 g NH4Cl

**Level 5 Answers**:

1. C3H8 + 5O2 🡪 3CO2 + 4H2O
   1. Oxygen
   2. 0.189 mol CO2
2. K2SO4 + BaCl2 🡪 2KCl + BaSO4
   1. 6.09 BaSO4
   2. K2SO4 is limiting, 0.465 g BaCl2 remain
3. 2Na3PO4 + 3CaCl2 🡪 6NaCl + Ca3(PO4)2
   1. See equation above
   2. CaCl2 is limiting
   3. 5.26 g Ca3(PO4)2
4. Na3PO4 + 3KOH 🡪 3NaOH + K3PO4
   1. See equation above
   2. 2.94 g Na3PO4, 3.02 g KOH
   3. Na3PO4
   4. 1.26 g KOH

**Level 6 Answers**:

1. Pb(OH)2 + 2HCl 🡪 2H2O + PbCl2
   1. Pb(OH)2
   2. 5.24 g HCl
   3. Yes
2. I2O5 + 5CO 🡪 5CO2 + I2
   1. 50.7 g I2
   2. 80.1 %
3. 3AgNO3 + FeCl3 🡪 3AgCl + Fe(NO3)3
   1. AgNO3
   2. 21.1 g AgCl
   3. 88.9 %

**Level 7 Answers**:

1. 3NaHCO3 + H3C6H5O7 🡪 3CO2 + 3H2O + Na3C6H5O7
   1. NaHCO3 is limiting
   2. 0.524 g CO2
   3. 0.238 g citric acid remain
2. 8H2S + 4O2 🡪 S8 + 8H2O
   1. 28.0 g S8 actual yield
3. S + O2 🡪 SO2; SO2 + CaO 🡪 CaSO3
   1. 7.9x107 g CaO
   2. 1.69x108 g CaSO3
4. 1. 14.0 g HCN
   2. 25.4 g NaCN
   3. 865 g HCN, much more than a lethal dose