

Name: \_\_\_\_\_ Block: \_\_\_\_\_

## '50' - Balancing Equations Worksheet

*Please Balance the following equations:*

- $\text{H}_2 + \text{O}_2 \rightarrow \text{H}_2\text{O}$
- $\text{H}_3\text{PO}_4 + \text{KOH} \rightarrow \text{K}_3\text{PO}_4 + \text{H}_2\text{O}$
- $\text{K} + \text{B}_2\text{O}_3 \rightarrow \text{K}_2\text{O} + \text{B}$
- $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
- $\text{Na} + \text{NaNO}_3 \rightarrow \text{Na}_2\text{O} + \text{N}_2$
- $\text{C} + \text{S}_8 \rightarrow \text{CS}_2$
- $\text{Na} + \text{O}_2 \rightarrow \text{Na}_2\text{O}_2$
- $\text{N}_2 + \text{O}_2 \rightarrow \text{N}_2\text{O}_5$
- $\text{H}_3\text{PO}_4 + \text{Mg}(\text{OH})_2 \rightarrow \text{Mg}_3(\text{PO}_4)_2 + \text{H}_2\text{O}$
- $\text{NaOH} + \text{H}_2\text{CO}_3 \rightarrow \text{Na}_2\text{CO}_3 + \text{H}_2\text{O}$
- $\text{KOH} + \text{HBr} \rightarrow \text{KBr} + \text{H}_2\text{O}$
- $\text{H}_2 + \text{O}_2 \rightarrow \text{H}_2\text{O}_2$
- $\text{Na} + \text{O}_2 \rightarrow \text{Na}_2\text{O}$
- $\text{Al}(\text{OH})_3 + \text{H}_2\text{CO}_3 \rightarrow \text{Al}_2(\text{CO}_3)_3 + \text{H}_2\text{O}$
- $\text{Al} + \text{S}_8 \rightarrow \text{Al}_2\text{S}_3$
- $\text{Cs} + \text{N}_2 \rightarrow \text{Cs}_3\text{N}$
- $\text{Mg} + \text{Cl}_2 \rightarrow \text{MgCl}_2$
- $\text{Rb} + \text{RbNO}_3 \rightarrow \text{Rb}_2\text{O} + \text{N}_2$
- $\text{C}_6\text{H}_6 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
- $\text{N}_2 + \text{H}_2 \rightarrow \text{NH}_3$
- $\text{C}_{10}\text{H}_{22} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
- $\text{Al}(\text{OH})_3 + \text{HBr} \rightarrow \text{AlBr}_3 + \text{H}_2\text{O}$
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
- $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$
- $\text{C}_3\text{H}_8 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
- $\text{Li} + \text{AlCl}_3 \rightarrow \text{LiCl} + \text{Al}$
- $\text{C}_2\text{H}_6 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
- $\text{NH}_4\text{OH} + \text{H}_3\text{PO}_4 \rightarrow (\text{NH}_4)_3\text{PO}_4 + \text{H}_2\text{O}$
- $\text{Rb} + \text{P} \rightarrow \text{Rb}_3\text{P}$
- $\text{CH}_4 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
- $\text{Al}(\text{OH})_3 + \text{H}_2\text{SO}_4 \rightarrow \text{Al}_2(\text{SO}_4)_3 + \text{H}_2\text{O}$
- $\text{Na} + \text{Cl}_2 \rightarrow \text{NaCl}$
- $\text{Rb} + \text{S}_8 \rightarrow \text{Rb}_2\text{S}$
- $\text{H}_3\text{PO}_4 + \text{Ca}(\text{OH})_2 \rightarrow \text{Ca}_3(\text{PO}_4)_2 + \text{H}_2\text{O}$
- $\text{NH}_3 + \text{HCl} \rightarrow \text{NH}_4\text{Cl}$
- $\text{Li} + \text{H}_2\text{O} \rightarrow \text{LiOH} + \text{H}_2$
- $\text{Ca}_3(\text{PO}_4)_2 + \text{SiO}_2 + \text{C} \rightarrow \text{CaSiO}_3 + \text{CO} + \text{P}$
- $\text{NH}_3 + \text{O}_2 \rightarrow \text{N}_2 + \text{H}_2\text{O}$
- $\text{FeS}_2 + \text{O}_2 \rightarrow \text{Fe}_2\text{O}_3 + \text{SO}_2$
- $\text{C} + \text{SO}_2 \rightarrow \text{CS}_2 + \text{CO}$
- $\text{Fe} + \text{S} \rightarrow \text{FeS}$
- $\text{KClO}_3 \rightarrow \text{KCl} + \text{O}_2$
- $\text{Al} + \text{O}_2 \rightarrow \text{Al}_2\text{O}_3$
- $\text{Fe}_2\text{O}_3 + \text{C} \rightarrow \text{CO} + \text{Fe}$
- $\text{K}_2\text{O} + \text{H}_2\text{O} \rightarrow \text{KOH}$
- $\text{K}_2\text{CO}_3 + \text{BaCl}_2 \rightarrow \text{KCl} + \text{BaCO}_3$
- $\text{Mg}(\text{OH})_2 + \text{H}_2\text{SO}_4 \rightarrow \text{MgSO}_4 + \text{H}_2\text{O}$
- $\text{KF} + \text{BaBr}_2 \rightarrow \text{BaF}_2 + \text{KBr}$
- $\text{HCl} + \text{NH}_3 \rightarrow \text{NH}_4\text{Cl}$
- $\text{Bi}_2(\text{SO}_4)_3 + \text{NH}_4\text{OH} \rightarrow \text{Bi}(\text{OH})_3 + (\text{NH}_4)_2\text{SO}_4$

## WORD EQUATIONS

Name \_\_\_\_\_

Write the word equations below as chemical equations and balance.

1. zinc + lead (II) nitrate yield zinc nitrate + lead

2. aluminum bromide + chlorine yield aluminum chloride + bromine

3. sodium phosphate + calcium chloride yield calcium phosphate + sodium chloride

4. potassium chlorate when heated yields potassium chloride + oxygen gas

5. aluminum + hydrochloric acid yield aluminum chloride + hydrogen gas

6. calcium hydroxide + phosphoric acid yield calcium phosphate + water

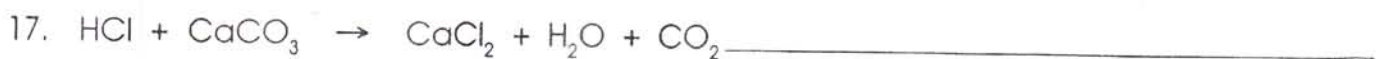
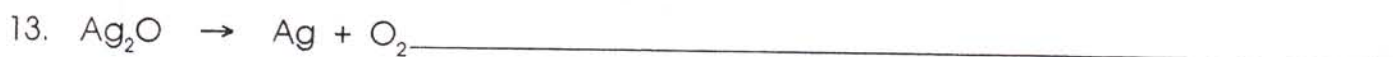
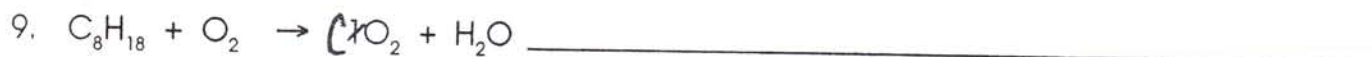
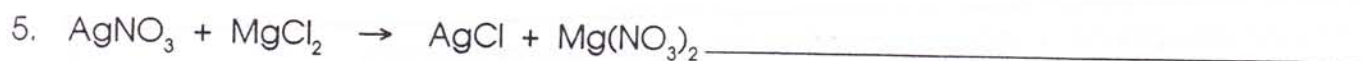
7. copper + sulfuric acid yield copper (II) sulfate + water + sulfur dioxide

8. hydrogen + nitrogen monoxide yield water + nitrogen

# BALANCING CHEMICAL EQUATIONS

Name \_\_\_\_\_

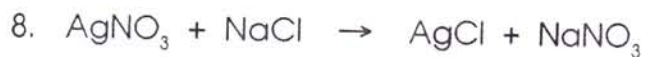
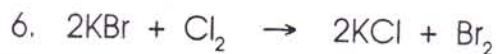
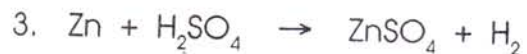
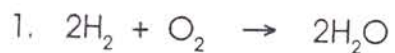
Rewrite and balance the equations below.



# CLASSIFICATION OF CHEMICAL REACTIONS

Name \_\_\_\_\_

Classify the reactions below as synthesis, decomposition, single replacement (cationic or anionic) or double replacement.



Name: \_\_\_\_\_ Block: \_\_\_\_\_

### Single-Replacement Reactions

If the replacement can occur, complete the reaction and balance it. If the reaction cannot happen, write N.R. (no rxn) on the product side. Please write the full reaction! You will need the Activity Series for this worksheet.

1. lead + zinc acetate →

2. iron + aluminum oxide →

3. silver nitrate + nickel →

4. sodium bromide + iodine →

5. aluminum bromide + chlorine →

6. sodium iodide + bromine →

7. calcium + hydrochloric acid →

8. magnesium + nitric acid →

9. silver + sulfuric acid →

10. potassium + water →

11. sodium + water →

## Balancing Chemical Equations – A tad more difficult (some of them)

- 1)  $\text{H}_2 + \text{O}_2 \rightarrow \text{H}_2\text{O}$
- 2)  $\text{S}_8 + \text{O}_2 \rightarrow \text{SO}_3$
- 3)  $\text{HgO} \rightarrow \text{Hg} + \text{O}_2$
- 4)  $\text{Zn} + \text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$
- 5)  $\text{Na} + \text{H}_2\text{O} \rightarrow \text{NaOH} + \text{H}_2$
- 6)  $\text{C}_{10}\text{H}_{16} + \text{Cl}_2 \rightarrow \text{C} + \text{HCl}$
- 7)  $\text{Si}_2\text{H}_3 + \text{O}_2 \rightarrow \text{SiO}_2 + \text{H}_2\text{O}$
- 8)  $\text{Fe} + \text{O}_2 \rightarrow \text{Fe}_2\text{O}_3$
- 9)  $\text{C}_7\text{H}_6\text{O}_2 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
- 10)  $\text{FeS}_2 + \text{O}_2 \rightarrow \text{Fe}_2\text{O}_3 + \text{SO}_2$
- 11)  $\text{Fe}_2\text{O}_3 + \text{H}_2 \rightarrow \text{Fe} + \text{H}_2\text{O}$
- 12)  $\text{K} + \text{Br}_2 \rightarrow \text{KBr}$
- 13)  $\text{C}_2\text{H}_2 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
- 14)  $\text{H}_2\text{O}_2 \rightarrow \text{H}_2\text{O} + \text{O}_2$
- 15)  $\text{C}_7\text{H}_{16} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
- 16)  $\text{SiO}_2 + \text{HF} \rightarrow \text{SiF}_4 + \text{H}_2\text{O}$
- 17)  $\text{KClO}_3 \rightarrow \text{KCl} + \text{O}_2$
- 18)  $\text{KClO}_3 \rightarrow \text{KClO}_4 + \text{KCl}$
- 19)  $\text{P}_4\text{O}_{10} + \text{H}_2\text{O} \rightarrow \text{H}_3\text{PO}_4$
- 20)  $\text{Sb} + \text{O}_2 \rightarrow \text{Sb}_4\text{O}_6$
- 21)  $\text{C}_3\text{H}_8 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
- 22)  $\text{Fe}_2\text{O}_3 + \text{CO} \rightarrow \text{Fe} + \text{CO}_2$
- 23)  $\text{PCl}_5 + \text{H}_2\text{O} \rightarrow \text{HCl} + \text{H}_3\text{PO}_4$
- 24)  $\text{H}_2\text{S} + \text{Cl}_2 \rightarrow \text{S}_8 + \text{HCl}$
- 25)  $\text{Fe} + \text{H}_2\text{O} \rightarrow \text{Fe}_3\text{O}_4 + \text{H}_2$
- 26)  $\text{N}_2 + \text{H}_2 \rightarrow \text{NH}_3$
- 27)  $\text{N}_2 + \text{O}_2 \rightarrow \text{N}_2\text{O}$
- 28)  $\text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2$
- 29)  $\text{SiCl}_4 + \text{H}_2\text{O} \rightarrow \text{H}_4\text{SiO}_4 + \text{HCl}$
- 30)  $\text{H}_3\text{PO}_4 \rightarrow \text{H}_4\text{P}_2\text{O}_7 + \text{H}_2\text{O}$
- 31)  $\text{CO}_2 + \text{NH}_3 \rightarrow \text{OC}(\text{NH}_2)_2 + \text{H}_2\text{O}$
- 32)  $\text{Al}(\text{OH})_3 + \text{H}_2\text{SO}_4 \rightarrow \text{Al}_2(\text{SO}_4)_3 + \text{H}_2\text{O}$
- 33)  $\text{Fe}_2(\text{SO}_4)_3 + \text{KOH} \rightarrow \text{K}_2\text{SO}_4 + \text{Fe}(\text{OH})_3$
- 34)  $\text{H}_2\text{SO}_4 + \text{HI} \rightarrow \text{H}_2\text{S} + \text{I}_2 + \text{H}_2\text{O}$
- 35)  $\text{Al} + \text{FeO} \rightarrow \text{Al}_2\text{O}_3 + \text{Fe}$
- 36)  $\text{Na}_2\text{CO}_3 + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O} + \text{CO}_2$
- 37)  $\text{P}_4 + \text{O}_2 \rightarrow \text{P}_2\text{O}_5$
- 38)  $\text{K}_2\text{O} + \text{H}_2\text{O} \rightarrow \text{KOH}$
- 39)  $\text{Al} + \text{O}_2 \rightarrow \text{Al}_2\text{O}_3$
- 40)  $\text{Na}_2\text{O}_2 + \text{H}_2\text{O} \rightarrow \text{NaOH} + \text{O}_2$
- 41)  $\text{C} + \text{H}_2\text{O} \rightarrow \text{CO} + \text{H}_2$
- 42)  $\text{H}_3\text{AsO}_4 \rightarrow \text{As}_2\text{O}_5 + \text{H}_2\text{O}$
- 43)  $\text{Al}_2(\text{SO}_4)_3 + \text{Ca}(\text{OH})_2 \rightarrow \text{Al}(\text{OH})_3 + \text{CaSO}_4$
- 44)  $\text{FeCl}_3 + \text{NH}_4\text{OH} \rightarrow \text{Fe}(\text{OH})_3 + \text{NH}_4\text{Cl}$
- 45)  $\text{Ca}_3(\text{PO}_4)_2 + 6 \text{SiO}_2 \rightarrow \text{P}_4\text{O}_{10} + \text{CaSiO}_3$
- 46)  $\text{N}_2\text{O}_5 + \text{H}_2\text{O} \rightarrow \text{HNO}_3$
- 47)  $\text{Al} + \text{HCl} \rightarrow \text{AlCl}_3 + \text{H}_2$
- 48)  $\text{H}_3\text{BO}_3 \rightarrow \text{H}_4\text{B}_6\text{O}_{11} + \text{H}_2\text{O}$
- 49)  $\text{Mg} + \text{N}_2 \rightarrow \text{Mg}_3\text{N}_2$
- 50)  $\text{NaOH} + \text{Cl}_2 \rightarrow \text{NaCl} + \text{NaClO} + \text{H}_2\text{O}$
- 51)  $\text{Li}_2\text{O} + \text{H}_2\text{O} \rightarrow \text{LiOH}$
- 52)  $\text{CaC}_2 + \text{H}_2\text{O} \rightarrow \text{C}_2\text{H}_2 + \text{Ca}(\text{OH})_2$
- 53)  $\text{Fe}(\text{OH})_3 \rightarrow \text{Fe}_2\text{O}_3 + \text{H}_2\text{O}$
- 54)  $\text{Pb}(\text{NO}_3)_2 \rightarrow \text{PbO} + \text{NO}_2 + \text{O}_2$
- 55)  $\text{BaO} + \text{H}_2\text{O} \rightarrow \text{Ba}(\text{OH})_2$
- 56)  $\text{Ca} + \text{AlCl}_3 \rightarrow \text{CaCl}_2 + \text{Al}$

- 57)  $\text{NH}_3 + \text{NO} \rightarrow \text{N}_2 + \text{H}_2\text{O}$
- 58)  $\text{H}_3\text{PO}_3 \rightarrow \text{H}_3\text{PO}_4 + \text{PH}_3$
- 59)  $\text{Fe}_2\text{O}_3 + \text{C} \rightarrow \text{CO} + \text{Fe}$
- 60)  $\text{FeS} + \text{O}_2 \rightarrow \text{Fe}_2\text{O}_3 + \text{SO}_2$
- 61)  $\text{NH}_3 + \text{O}_2 \rightarrow \text{NO} + \text{H}_2\text{O}$
- 62)  $\text{Si} + \text{S}_8 \rightarrow \text{Si}_2\text{S}_4$
- 63)  $\text{Hg}_2\text{CO}_3 \rightarrow \text{Hg} + \text{HgO} + \text{CO}_2$
- 64)  $\text{SiC} + \text{Cl}_2 \rightarrow \text{SiCl}_4 + \text{C}$
- 65)  $\text{Al}_4\text{C}_3 + \text{H}_2\text{O} \rightarrow \text{CH}_4 + \text{Al}(\text{OH})_3$
- 66)  $\text{V}_2\text{O}_5 + \text{HCl} \rightarrow \text{VOCl}_3 + \text{H}_2\text{O}$
- 67)  $\text{Ag}_2\text{S} + \text{KCN} \rightarrow \text{KAg}(\text{CN})_2 + \text{K}_2\text{S}$
- 68)  $\text{Au}_2\text{S}_3 + \text{H}_2 \rightarrow \text{Au} + \text{H}_2\text{S}$
- 69)  $\text{ClO}_2 + \text{H}_2\text{O} \rightarrow \text{HClO}_2 + \text{HClO}_3$
- 70)  $\text{KO}_2 + \text{CO}_2 \rightarrow \text{K}_2\text{CO}_3 + \text{O}_2$
- 71)  $\text{MgNH}_4\text{PO}_4 \rightarrow \text{Mg}_2\text{P}_2\text{O}_7 + \text{NH}_3 + \text{H}_2\text{O}$
- 72)  $\text{MnO}_2 + \text{HCl} \rightarrow \text{MnCl}_2 + \text{H}_2\text{O} + \text{Cl}_2$
- 73)  $\text{Pb} + \text{Na} + \text{C}_2\text{H}_5\text{Cl} \rightarrow \text{Pb}(\text{C}_2\text{H}_5)_4 + \text{NaCl}$
- 74)  $\text{Ca}(\text{OH})_2 + \text{H}_3\text{PO}_4 \rightarrow \text{CaHPO}_4 + \text{H}_2\text{O}$
- 75)  $\text{Zn} + \text{NaOH} + \text{H}_2\text{O} \rightarrow \text{Na}_2\text{Zn}(\text{OH})_4 + \text{H}_2$
- 76)  $\text{SrBr}_2 + (\text{NH}_4)_2\text{CO}_3 \rightarrow \text{SrCO}_3 + \text{NH}_4\text{Br}$
- 77)  $\text{Hg}(\text{OH})_2 + \text{H}_3\text{PO}_4 \rightarrow \text{Hg}_3(\text{PO}_4)_2 + \text{H}_2\text{O}$
- 78)  $\text{Ca}_3(\text{PO}_4)_2 + \text{SiO}_2 + \text{C} \rightarrow \text{CaSiO}_3 + \text{P}_4 + \text{CO}$
- 79)  $\text{I}_4\text{O}_9 \rightarrow \text{I}_2\text{O}_6 + \text{I}_2 + \text{O}_2$   
(There are more than one answers to 79)
- 80)  $\text{C}_2\text{H}_3\text{Cl} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{HCl}$
- 81)  $(\text{NH}_4)_2\text{Cr}_2\text{O}_7 \rightarrow \text{NH}_3 + \text{H}_2\text{O} + \text{Cr}_2\text{O}_3 + \text{O}_2$

- 82)  $\text{Al} + \text{NaOH} + \text{H}_2\text{O} \rightarrow \text{NaAl(OH)}_4 + \text{H}_2$
- 83)  $\text{NH}_4\text{Cl} + \text{Ca(OH)}_2 \rightarrow \text{CaCl}_2 + \text{NH}_3 + \text{H}_2\text{O}$
- 84)  $\text{Al} + \text{NH}_4\text{ClO}_4 \rightarrow \text{Al}_2\text{O}_3 + \text{AlCl}_3 + \text{NO} + \text{H}_2\text{O}$
- 85)  $\text{H}_2\text{SO}_4 + \text{NaHCO}_3 \rightarrow \text{Na}_2\text{SO}_4 + \text{CO}_2 + \text{H}_2\text{O}$
- 86)  $\text{Ca}_{10}\text{F}_2(\text{PO}_4)_6 + \text{H}_2\text{SO}_4 \rightarrow \text{Ca(H}_2\text{PO}_4)_2 + \text{CaSO}_4 + \text{HF}$
- 87)  $\text{Ca}_3(\text{PO}_4)_2 + \text{H}_2\text{SO}_4 \rightarrow \text{CaSO}_4 + \text{Ca(H}_2\text{PO}_4)_2$
- 88)  $\text{H}_3\text{PO}_4 + (\text{NH}_4)_2\text{MoO}_4 + \text{HNO}_3 \rightarrow (\text{NH}_4)_3\text{PO}_4 + 12\text{MoO}_3 + \text{NH}_4\text{NO}_3 + \text{H}_2\text{O}$
- 89)  $\text{C}_4\text{H}_{10} + \text{Cl}_2 + \text{O}_2 \rightarrow \text{CO}_2 + \text{CCl}_4 + \text{H}_2\text{O}$
- 90)  $\text{C}_7\text{H}_{10}\text{N} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{NO}_2$
- 91)  $\text{H}_3\text{PO}_4 + \text{HCl} \rightarrow \text{PCl}_5 + \text{H}_2\text{O}$
- 92)  $\text{HCl} + \text{K}_2\text{CO}_3 \rightarrow \text{KCl} + \text{H}_2\text{O} + \text{CO}_2$
- 93)  $\text{Ca(ClO}_3)_2 \rightarrow \text{CaCl}_2 + \text{O}_2$
- 94)  $\text{C}_2\text{H}_5\text{OH} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
- 95)  $\text{Xe} + \text{F}_2 \rightarrow \text{XeF}_6$
- 96)  $\text{NH}_4\text{NO}_3 \rightarrow \text{N}_2\text{O} + \text{H}_2\text{O}$
- 97)  $\text{Au}_2\text{O}_3 \rightarrow \text{Au} + \text{O}_2$
- 98)  $\text{C}_4\text{H}_{10} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
- 99)  $\text{Fe}_3\text{O}_4 + \text{H}_2 \rightarrow \text{Fe} + \text{H}_2\text{O}$
- 100)  $\text{O}_2 \rightarrow \text{O}_3$
- 101)  $\text{I}_2 + \text{HNO}_3 \rightarrow \text{HIO}_3 + \text{NO}_2 + \text{H}_2$
- 102)  $\text{C}_6\text{H}_6 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
- 103)  $\text{C}_2\text{H}_5\text{OH} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
- 104)  $\text{HClO}_4 + \text{P}_4\text{O}_{10} \rightarrow \text{H}_3\text{PO}_4 + \text{Cl}_2\text{O}_7$
- 105)  $\text{BaCl}_2 + \text{Al}_2(\text{SO}_4)_3 \rightarrow \text{BaSO}_4 + \text{AlCl}_3$
- 106)  $(\text{NH}_4)_2\text{Cr}_2\text{O}_7 \rightarrow \text{Cr}_2\text{O}_3 + \text{N}_2 + \text{H}_2\text{O}$
- 107)  $\text{NaHCO}_3 \rightarrow \text{Na}_2\text{CO}_3 + \text{CO}_2 + \text{H}_2\text{O}$
- 108)  $\text{Fe}_2(\text{C}_2\text{O}_4)_3 \rightarrow \text{FeC}_2\text{O}_4 + \text{CO}_2$
- 109)  $\text{Ca}_3\text{P}_2 + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2 + \text{PH}_3$
- 110)  $\text{As} + \text{NaOH} \rightarrow \text{Na}_3\text{AsO}_3 + \text{H}_2$