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| image003 | **Problem Set 1.12:**     **Balancing Equations**  **Instructions:**  Balance the equations. For the second part you have to write the symbol equation first. |

1.     \_\_ Ca     +      \_\_ O2      ------>      \_\_ CaO

2.     \_\_ Na     +       \_\_ H2O     ------>     \_\_ NaOH            +      \_\_ H2

3.     \_\_ Zn     +       \_\_ H3PO4          ------>     \_\_ Zn3(PO4)2         +     \_\_ H2

4.     \_\_ CO2     +         \_\_ H2       ------>     \_\_ CH4            +     \_\_ H2O

5.     \_\_ NH3      ------>      \_\_ N2      +      \_\_ H2

6.     \_\_ CO     +          \_\_ NO2      ------>    \_\_ CO2     +      \_\_ NO

7.     \_\_ P4      +           \_\_ Cl2     ------>     \_\_ PCl3

8.     \_\_ HBr     +         \_\_ O2     ------>    \_\_ H2O      +     \_\_ Br2

9.     \_\_ Al     +      \_\_ O2      ------>    \_\_Al2O3

10.  \_\_Na2S    +    \_\_ HCl  ------->    \_\_ NaCl     +     \_\_ H2S

11.  \_\_ NaOH    +    \_\_ FeCl3          ------->    \_\_ NaCl      +      \_\_ Fe(OH)3

12.  \_\_ KOH     +     \_\_ H3PO4        ------->    \_\_ K3PO4  +     \_\_ H2O

13.  \_\_ NaOH     +    \_\_ CuSO4       ------->    \_\_ Na2SO4   +   \_\_ Cu(OH)2

14.  \_\_ HNO3    +    \_\_ Ca(OH)2 ------>    \_\_ H2O     +       \_\_ Ca(NO3)2

15.  \_\_ NH3     +     \_\_ CuO ------->    \_\_ H2O     +   \_\_ Cu     +   \_\_ N2

First write the chemical formula for each compound, then balance the following chemical equations.  Marks are for the correct chemical formulas and for the coefficients in front of each compound. If the equation is already balanced, write *balanced* beneath the equation.

**1.**         iron + sulphur   *reacts to produce*   iron (II) sulphide

**2.**         sodium chloride + silver nitrate *reacts to produce*    sodium nitrate +  silver chloride

**3.**         calcium oxide + dihydrogen monoxide (water)  *reacts to produce*   calcium hydroxide

**4.**         carbon + oxygen gas *reacts to produce*   carbon dioxide

**5.**         calcium hydroxide + carbon dioxide *reacts to produce* calcium carbonate + water

**6.**         sodium chloride + hydrogen sulphate *reacts to produce* sodium sulphate + hydrogen chloride

**7.**         hydrogen gas + oxygen gas *reacts to produce* dihydrogen monoxide (water)

**8.**         zinc + copper (II) sulphate *reacts to produce* zinc sulphate + copper

**9.**         magnesium bromide + chlorine gas *reacts to produce* magnesium chloride + bromine gas

**10.**       sodium + water *reacts to produce* sodium hydroxide + hydrogen gas

**11.**       hydrogen gas + chlorine gas *reacts to produce* hydrogen chloride

**12.**       aluminum + iron (III) oxide *reacts to produce* aluminum oxide + iron

**13.**       silver sulphate + copper *reacts to produce* copper (II) sulphate + silver

**14.**       ammonium nitrite *reacts to produce* nitrogen gas + dihydrogen monoxide (water)

**15.**       lead (II) nitrate + ammonium carbonate *reacts to produce* lead (II) carbonate + ammonium nitrate